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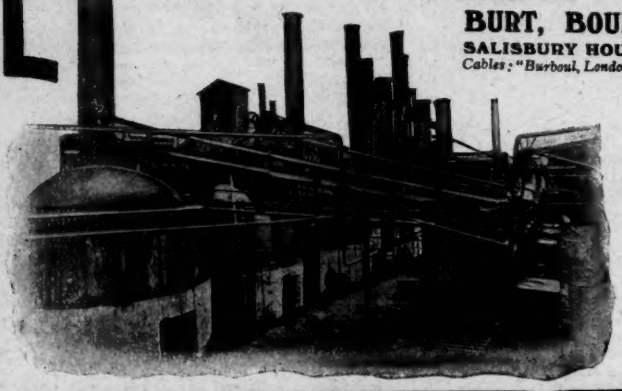

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VOL. CLXX., No. 3233.] WEDNESDAY, APRIL 29, 1925. [77TH YEAR.

EDITORIAL NOTES.

The New Wembley.

In another twelve days the public will be flocking to the British Empire Exhibition; the reopening of which is to be performed by His Majesty the King on Saturday, May 9. Gas and the secondary products of its manufacture are to take their good part in the new display. We understand there has been additional demand on this occasion upon gas service to meet the requirements of the exhibitors; and it is well known that our primary commodity will have a considerable part in the work of the several caterers who will be dealing with the feeding of the great multitude during the six months through which the Exhibition will be open to the public. Regarding the Gas Exhibit, the features of it are to be entirely new, although the old setting will remain. But in addition to the industry's artistic buildings, further adjoining space has been taken, which will be a great convenience for cookery demonstrations and so forth. This will prevent the overcrowding which sometimes took place in the Exhibit last year, and will provide more seating accommodation for the many housewives who will be attracted by the lectures and the demonstrations of the methods of cooking Empire foods. An Imperial atmosphere will be introduced on this occasion by the exposition of the uses of gas—industrial as well as domestic—in our Dominions and Colonies. There is no doubt that the Committee, particularly those who are taking the most active part in the plans, have an intention even to outdo the scheme which proved so magnetic to the public during 1924. In addition to the Imperial feature, the domestic and industrial applications of gas at home will be kept well to the fore. The abilities of gas for labour-saving—so solving the troubles of the housewife, without (as is the case with a competitor) fear of collapse, and with the certainty of economy and high efficiency, if waste is not allowed—will also be continually proved to visitors.

The Gas Exhibit is to be full of movement. Prominently displayed on the main gangway, a motor manufacturing exhibit is being arranged, showing the important industrial uses of gas in that industry. A similar space on the other side of the pavilion entrance will show two gas-engines—one of them of 150 H.P., and over 9 ft. high—continuously at work, and, among other duties, supplying power to a gas wafer-baking oven, from which will be produced no less than 100 tins of wafers daily. Various other industrial appliances will be seen in operation. A working exhibit of pottery making with gas-fired furnaces, conducted by disabled ex-service men of the Ashtead Pottery, is certain to fascinate many. Another interesting section will show the applications of gas in various hobbies—such as woodwork, model making, metal work, and amateur wireless. What with the addition of daylight cinemas, illustrating the thousand-and-one domestic and industrial uses of gas, and cookery demonstrations and lectures, there is no fear of the live gas industry having an exhibit which lacks life.

There will again be the demonstration of high-power low-pressure lighting in the Amusements Park, and gas will be represented in the great housing exhibit in the Palace of Engineering. This exhibit, we are informed, will occupy at least 60,000 sq. ft., and every foot of the space will provide a practical detail in the solution of the housing problem. The main object is to prove, by the erection of actual full-sized houses, the economic and artistic use to which many new materials and methods can now be applied in the construction of houses. The buildings will be of varied types from working-class dwellings to country cottages. In the organization of this display, the Government are participating, through the patronage and advice of the Minister of Health; and municipalities, and those engaged in building by private enterprise, are co-operating to make the demonstration as comprehensive and up-to-date as possible.

It is also learned that the National Gas Council, through the Central Executive Board, have acquired space in the Chemical Section of the Palace of Industry for tar propaganda. The design of the accompaniments for this exhibit has been confided to the well-known artist, Mr. Norman Wilkinson; and he will, there is confidence, do credit to his subject. Here samples of road-making material will be exhibited, in addition to a stretch of tar-treated road; and at the stand literature will also be available descriptive of the advantages of tar in the construction or surfacing of roads. Steps are being taken to ensure that surveyors, chairmen of highway committees, and others interested in the road question will have an opportunity of seeing what we are assured will be a very interesting exhibit. The chemical industry will again this year occupy a prominent position. As last year, the display is being organized by the Association of British Chemical Manufacturers—a guarantee that it will be an interesting and comprehensive exhibit. A number of new features will be introduced, and the keynote will be information for the public. In the scientific section, it is proposed to show how strikingly connected are the various stages from basic materials to finished products. From the consideration of raw coal, the visitor is to be taken through the various stages of its distillation, the products resulting therefrom, such as tar and ammonia, the treatment of tar for the resulting intermediate products, which lead up to the manufacture of dyestuffs. The production of benzole, disinfectants, fine chemicals, medicinal products, and the numerous other chemicals obtained from coal will also be illustrated. The wonders of coal and its products are only partially realized by the public; but at this exhibition the scientists propose to be informative as to these things, which have such an important part in the service and economy of everyday life.

Of the Exhibition generally, it may be said that the interest which the Homeland, Dominions, and the Colonies are furnishing on this occasion will be an enlargement of that which was enjoyed by the public through the wonderful display of last year. From the marvels of our Empire, and the demonstrations of the relationship that exists between science and the things of everyday life, down to the amusements which will be provided, there will be something in the great display for every visitor, whatever his interests. Splendid and attractive as was the gigantic show last year, the one this year will be lighter and brighter, and will make its call to people far and near, even to those across the seas.

An Electrical Inquiry into Domestic Supplies.

A considerable amount of liveliness is noticeable in the electricity supply industry in respect of the exploration of conditions with a view to future developments. There is the Committee, who have been sitting under the chairmanship of Lord Weir, to whom the Government entrusted the task of advising them on the lines that should be adopted in regard to generation and distribution with the object of increasing the availability of electrical energy. The Minister of Transport and the Minister of Labour have been talking in charming language of the interest the Government are taking in the efforts to promote the coursing of electrical energy here, there, and everywhere. But the Advisory Committee have not, so far as we are aware, yet reported; and so we cannot think that the Government have at present any definitely moulded views as to the future, or the assistance they are prepared to render. Now the Electricity Commissioners have appointed a Committee to consider the questions of the development of domestic consumption and alternative methods of charging. The constitution of the Committee is purely electrical; it comprises members of the British Electrical Development Association, the Association of Electric Power Companies, the Municipal Electrical Association, and the Provincial Electric Supply Committee.

It is an interesting feature to find a Government Department concerning itself in this way in the business end of a statutory industry. The fact will undoubtedly have an influence within the industry if recommendations are made by the Committee which commend themselves to the Commissioners, and, through them, are endorsed by the Government. But as to the effectiveness of any recommendations that may be submitted, this will rest entirely with the public. The point has frequently been made by us—that with Government interest so manifestly directed towards the electrical industry, the policy the gas industry should pursue is the highest possible standard of service among the public. In that way it will best protect its interests. It may be frankly confessed that we shall be curious to learn the nature of the recommendations that are made by the Committee of investigation who are to advise as to the domestic development of the uses of electricity. In the first place, they are asked to consider and report what steps are being taken by authorized undertakers to encourage and extend the application of electricity to domestic purposes; the relative effectiveness of such steps; and what further steps could be taken to bring about an increased consumption of electricity in the household. It seems to us that the reference savours somewhat of a reflection upon the business acumen of the existing administrators and managers of electricity undertakings. The potentialities in domestic electrification differ in every area; and there can be no one formula which can have universal application to the encouragement and extension of the use of electricity. Because of the diversity of conditions, it is difficult to judge as to the "relative" effectiveness of the steps already taken to secure development. We may be pardoned for thinking that if electrical undertakings are administered and managed by competent men, they themselves have already considered the trading methods applied in other districts having correspondence with theirs, to ascertain whether or not they are superior to their own. But apparently the Electricity Commissioners do not regard the matter in the same light as ourselves, and are of opinion that the capacity of local administrators for judgment requires supplementing by an Advisory Committee drawn from the various organizations mentioned. Furthermore, one would imagine that all normal steps that can be taken to bring about an increased consumption of electricity are well known to the administrators and executive officials of electricity undertakings. It will be of little use for the Committee merely to present known and normal practices as the "further steps." These must be novel and therefore abnormal. Hence the interest there will be in seeing what the Committee will propose in their report. They will have to be clever if they can devise plans which have not been previously thought of and tried in the forty and odd years of the electricity industry's statutory life.

Then there is that eternal matter of tariffs. As long as there has been an interest on our part in the affairs of the electricity supply industry, the charges for electricity have almost constantly been the subject of attention and discussion. For electricity supply it is felt that something special in the nature of charging is needed. Apart from flat rates and discounts according to purpose and character of patronage, the method most favoured so far is the bi-part one—a fixed charge and a low price per unit. But in most cases the fixed charge is a percentage upon the rateable value of, or upon the floor area of certain rooms in, a house. This sounds ludicrous; but the fact remains that the men of the electricity industry have found nothing better. Neither system has, in respect of the fixed charge, any definite relation to the electrical requirements of the householder. Many electrical men are very properly of opinion that some two-part method should be devised, the fixed charge of which should have relation to the electrical requirements of the consumer. That is the only legitimate foundation for such a system; it is the only manner in which can be eliminated the injustices as between consumers which are found through the operation of the rateable value and floor area elements in existing bi-part systems. We rather think the Electricity Commissioners are surprised that more undertakings have not applied for permission to substitute a two-part tariff for the flat rate one—not compulsorily, but at the option of the consumer. The second item in the reference to the Committee asks them to investigate and report as to what methods of charging for domestic supplies could be authorized as standard ones (subject to the fixing of an appropriate quantum in individual cases) for adoption, at the option of authorized undertakers, in lieu of charging for the actual amount of energy supplied, or by the electrical quantity contained in the supply. There the Commissioners have set the Committee the task of attempting to discover something which the perennial exercise of the best brains in the industry has not yet succeeded in doing. Perhaps concentrated effort will be victorious where scattered endeavour has failed. There are words in the reference against which some existing consumers might protest did they know of them. They are "for adoption at the option of authorized undertakers." Some consumers, until they know of the method proposed to be substituted for (say) a flat-rate system, might object to the option resting only with the authorized undertakers. Now why not set this matter at rest, and get into uniformity with the gas industry? The domestic purposes other than lighting for which the electrical industry are heartily yearning are cooking and room and water heating. Then why not charge by the therm (which has direct relation to those uses), and so get the two competing industries on one basis? We can see the men of the electricity industry smiling over this; we agree there is room for the smile. We also concur in what will be their view, that they would be foolish to enter into competition on the basis of a unit of heat—100,000 B.Th.U.—such as has been applied by statute to the gas industry. But perhaps the Committee may think differently, and will at least take the idea into consideration, even though they reject it as being derogatory to the competitive position for heating purposes of the purveyors of electrical energy.

Then, we see, it may be necessary, in order that the Committee's recommendations may be effective, to make application for legislative powers. The Committee are, in fact, asked to report what legislative powers (if any) beyond those already conferred by the Electricity (Supply) Act would be required to give effect to any recommendations that may be made. If legislation is contemplated simply to make the recommendations permissive, then no harm would be done; but if compulsory application is in view, it would depend upon the nature of the recommendations whether or not the electricity industry would rebel against this method of altering their statutory powers and administrative rights.

We are of opinion there might be a serviceable extension of the reference to the Committee to cognate and, indeed, very pertinent matters. A couple may be suggested for the consideration of the Electricity Commissioners. The first is, What would be the effects in respect of electricity generating and distributing plants assuming these were called upon to give an amount of heat equivalent to the coal now used in a given district—particularly having regard to the seasonal requirements for room heating, the

vagarious temperatures in winter time, and the fact that the peak of the lighting load then obtains? The second point is, Is it to the country's economic advantage that coal should be used for the production of electricity for domestic heating purposes, in view of the efficiencies of generation, distribution, and utilization? Perhaps the Board of Fuel Research might be invited to aid the Committee, if the Commissioners can see their way to extend the scope of the inquiry in the manner suggested. The consideration of these two matters should have precedence of the other three, for upon the answers to the former would greatly depend the necessity for spending much time upon the latter.

Low-Grade Gas and the Unaccounted-for Percentage.

There were several matters of more than passing interest in the Presidential Address of Mr. F. A. West, of Newark, to the members of the Eastern Counties Gas Managers' Association [*ante* pp. 237-240]. In it are found the broad views of a thinker who forms judgment from personal experience and experiment, and is not inclined to attach himself to any particular flock who adopt the practices of those whom they regard as dependable leaders. The members, after visiting the Newark Works and hearing the Presidential Address, have several matters over which to indulge in a little mental exercise for the purpose of examining into, and forming conclusions upon, their validity. But we are confident that, whatever other engineers and managers may think, Mr. West will not shift in any degree from the opinions he has formed as to the best course of procedure in the circumstances with which he is surrounded at Newark. However, we must preface what will be regarded as the cardinal and controversial points of the address by a brief reference to general matters. The Gas Company (whose property is about to pass into the hands of the Corporation) were badly in want of new works; but instead of going to a fresh site, economy suggested the piecemeal reconstruction of the works, until now there is hardly a remnant of the old remaining, although the arrangement may not be precisely what Mr. West would have selected or designed had he been dealing with a virgin site, and so had freedom for the lay-out. He has continued horizontal retorts; and from his method of operating them, he is obtaining a regular flow of gas of even quality. Working 12½ cwt. charges in twelve hours, charging every six hours, and employing temperatures of from 1300° to 1330° C., he is making 72·3 therms from South Yorkshire and Nottingham coal; and, when four beds are at work, the output is equal to 140,000 c.ft. per man per day, for every operation in the retort house—including clinkering furnaces, removing ashes, sweeping-up, &c. No one will be prepared to criticize these results, having regard to the circumstances. So working, and at the temperatures mentioned, it is hoped the settings will have a long life. Absolute control is maintained by routine testing throughout the operations. In this way, troubles are often avoided; and, moreover, a regular supply of 475 B.Th.U. gas is given, of uniform composition and specific gravity. Incidentally, it may be suggested that a useful hint will be found by some engineers in the description given by the President of his coke-handling plant, which was made by a local firm from second-hand steel work from the old retort house.

It is to the controversial part of the address to which we particularly wish to direct attention, because we are confident that there will be dissentients from the views expressed, as well as strong supporters. From his experience with low-grade gas (no lower than 410 B.Th.U.), Mr. West is persuaded that it is uneconomical, and not in the best interests of an undertaking such as that at Newark. He finds that the troubles he experienced through the distribution of gas of that calorific value are disappearing, with economic advantages, by the supply of gas of no higher value than 475 B.Th.U.—only a 16 p.ct. increase. His deductions from the Newark experiences are that, while there are admitted advantages for almost every gas-works in being equipped with alternative methods of gas manufacture, there are also decided disadvantages. He is convinced that in the smaller works it is not an economical proposition to run two different types of gas-producing plant at the same time, as, in such circumstances, the best efficiency cannot be obtained from either. That is true in respect of the smaller works, but, in all industrial works, one has to take into consideration economic efficiency as well as plant efficiency before final judgment is passed in respect of such a question as this. He admits that there is in the auxiliary plant an aid to the control of the local coke market; and, in existing coke market conditions, this advantage is one to which due weight must be given, with, concurrently, other secondary products reduced in value. Any outlet for the profitable utilization of coke is welcome at the present time; and, looking also at developments in competition in the coke market, we are not disposed to belittle this aspect of the matter, having regard to the ultimate economic considerations. There must be regard for the future as well as the present. We also hold that the changing conditions in respect of labour must be kept in view—not so much labour within the industry, but in those industries upon which gas undertakings depend for materials. An obligation rests upon those who have the control of such a supply as that of gas to do their utmost to maintain it in times of emergency as well as in normal conditions. We will not say this is as important as giving constant service in respect of pressure, calorific value, composition, and specific gravity; but it has an importance which should not be neglected, in view of the reliance placed to-day on gas for light, heat, and power. It seems to us that the only point Mr. West has in his favour is the one that two small plants cannot be continually worked each to its highest efficiency. In normal conditions it is not difficult with a water gas or complete gasification plant and a coal-gas plant, if both are under good supervision, to mix the two gases in determined proportions, and so give a supply constant in all respects.

The next point is as to the supply of low-grade gas. Mr. West's experiences have not been good at Newark with gas of 410 B.Th.U.; and he has retraced his steps to 475 B.Th.U., and is much happier in his particular circumstances. He puts the position tersely when he says that, while the low-grade gas was economical to manufacture, it was not the cheapest to sell. What he found was that, as the make went up, the unaccounted-for gas increased in direct ratio until the alarming figure of 20 p.ct. was reached, and there seemed to be no finality about it. So far as the mains are concerned, if they are in sound state, there should not be more leakage with the low-grade gas than with the high grade, unless (with unsound joints) the greater leakage be due to the use of higher pressures with the former. But the fact remains that since the high-grade gas (if 475 B.Th.U. quality is entitled to that nominal distinction) was introduced, the percentage of unaccounted-for gas has in two years been reduced from 20 to 13. This fact the President regards as sufficient evidence to show he is on the right lines. Thermally the loss of 20 c.ft. out of every 100 c.ft. of 410 B.Th.U. gas means a loss of 8200 B.Th.U., while the loss of 13 c.ft. out of every 100 c.ft. of 475 B.Th.U. gas means a loss of 6175 B.Th.U. From the economy point of view the President is right. So far, however, as the distributing system is concerned, we cannot see that there should be a reduction of the unaccounted-for percentage by the mere process of increasing the calorific value by 65 B.Th.U. per c.ft. But there must be a cause for the effects described; and there can be little doubt that the real cause of the high percentage of unaccounted-for gas was the condition which customers' meters attained—after, so we gather, shorter service—during the reign of the low-grade gas. There is no doubt that with low-grade gas there must be complete removal of all impurities which have a deteriorating effect upon the metal parts of meters. The leathers of the meters, too, perished considerably during the years of the supply of the low-grade gas; while the greater proportion of hydrocarbons in the richer gas is having a good protective influence. Those are the points over which there may be discussion between the advocates respectively of low-grade gas and what to-day may be described as the normal grades of gas. And we shall not be surprised to hear of experiences where there has been no undue increase of the unaccounted-for percentage where low-grade gas is distributed. However, technically that is one of the

outstanding features of the address; and in it there is a challenge based on an experience of some duration. But we are not prepared to say that what is stated would apply as conclusive in all local and economic circumstances. It may be that there will have to be greater recourse to complete gasification and lower grades of gas as time passes. No one can yet say positively what will happen; but should that come to pass, then inventive faculties will set to work to defeat such attendant drawbacks as are described in the address.

A highly pleasing feature of the deliverance is the President's firm views on the subject of service. He is a strong believer in supervision not stopping short at the meter, but that it should be carried into the vital quarters beyond. Newark may be classed as one of the pioneers in this. Some years ago the Company obtained an enactment which enabled them to specify the size of internal pipes; and now architects, builders, and gasfitters are all required to work to specification in the piping of houses. Then, again, the undertaking has a well-trained inspector whose duty is to call at every house and inquire if, and see for himself that, everything is working satisfactorily. Mr. West is quite convinced this is an economical scheme, as many small defects are discovered and put right which would otherwise cause the consumer to be dissatisfied. All who take the long and the correct view will agree with him that the general policy of up-to-date gas undertakings should be service to the public, if they are to keep abreast of the times, and meet competition successfully. It is indeed much better to charge a fraction of a penny per therm more for gas, and give thorough satisfaction, than to sell cheaper gas, and not trouble about the consumers realizing good results. Though that fraction of a penny may have, under the sliding-scale, a slight effect upon the dividends of share and stock holders, it is one of the soundest pieces of protection they could have for their capital in these keenly competitive days.

Whatever part of the address is considered, we see in it that the President has one objective to all his doings within the opportunities provided by his environment. It is—Good Service. That should be the predominant consideration throughout the gas industry. It is the highway to maximum progress.

The Industrial Business.

There are indications of a larger activity in the gas industry in connection with the application of gas to industrial operations, and above all a bigger recognition of the fact that, for the best and permanent promotion of this branch of business gas salesmen with special knowledge are required. The "B.C.G.A." have contributed to the promotion of specialization by the formation of a Circle for industrial gas salesmen only; the point as to special knowledge and acumen was strongly emphasized by Mr. Dean Chandler in the remarkably engaging and information imparting paper (published last week) which he contributed to the London and Southern District Junior Gas Association; and the same view underlies all that was said in the paper, which concentrated much, that Mr. C. Bryan Donkin read at the meeting of the Eastern Counties Gas Managers' Association last Wednesday. The largely increased attention which is being given to this subject is very opportune. Industrial depression is fairly rife; there are signs that revival is at hand, but that it is likely to be a progressive revival, and not one which will come upon the country as a rolling tide. The conditions therefore admirably serve as an opportunity for the exploitation of industrial gas heating.

Those in charge of industries are looking around to ascertain where and how they can effect economies; and the gas industry has the means available for assisting in its promotion. But a great deal of care is necessary in treating this matter, because the experiences of gas heating during the war had a twofold effect; and there is need to correct any false impression that may have been formed during that period, and to further the good impressions that were made by being in a position to show the advances that have since been achieved. We get mention of the dual impressions by taking together the papers by Mr. Bryan Donkin and Mr. Dean Chandler. The former states that "during the war, when furnaces were required quickly and in large numbers, there was no time to go into questions of design and efficiency. Consequently users got the impression that gas was an expensive and inefficient fuel. However, very great advances have been made in the scientific design of the gas furnace; and gas can now show efficiencies far greater than other fuels." Mr. Dean Chandler's point of view is: "The use of town gas in all branches of engineering and industrial activity was largely a war-time development. . . . . It was thought in some quarters that the industrial load which had been built up during the war would, after the Armistice, decline and be finally lost; but the advantages of the use of gas as a fuel for a hundred-and-one purposes had been conclusively demonstrated, and its future was thereby assured. Of course, it was to be expected that a sudden drop in the load would occur immediately after the cessation of fighting, but with the return of more normal conditions in industry, the temporary set-back has gradually been made good." Both authors are right. War-time experiences—when all was push and hurry, and time and not cost was the important thing—did give to many men in industry the idea that the fuel cost of gas was high; while others saw the economy and efficiency attributes of gas compared with solid fuel. It is highly important that those controlling industry should get detached from the consideration of fuel costs alone, and give consideration to the economies and higher efficiencies which the change to gaseous fuel produces, and which reduces the over-all costs per unit of production. That is a matter that must be kept well before those concerned in industrial work. Even if fuel costs are considered alone, both Mr. Dean Chandler and Mr. Bryan Donkin show the increased knowledge, compared with the early adventure of gas in this field, that exists to-day as to the points to which strict observance must be given in order to gain higher thermal efficiencies and thus lower the fuel cost *per se*. There is also the question of the correct methods of application, which have a considerable bearing upon fuel cost. There are a right way and many wrong ways of applying gas as a fuel in industrial operations; and that is why a person not fully competent to deal with large propositions may do irreparable harm, through not being able to advise in a manner which will give the consumer the maximum economy. Mr. Dean Chandler supplies an instance of how, by laboratory investigation, the South Metropolitan Company succeeded in proposing an entirely new system for the heating of steel tram wheel tyres, which reduced the consumption of gas, to the L.C.C. Tramway Department, from 0·7 to 0·2 therm per tyre; and another example is given of a development which resulted in a greatly enhanced quality of product.

The papers by Mr. Bryan Donkin and Mr. Chandler contain much information for every gas man who is engaged in the industrial gas business, and they should be read together, and be carefully studied. The subject is one which interests most gas managers, because there is hardly a gas-supply area in which there is not some industry in which gas can be applied. Even villages have now their garages in which motor-car repairs are carried out, and which require heat for the work. The industrial consumer is, as a rule, one whose custom is well worth having; and it can be obtained and retained by gas undertakings by attention to such matters as both authors present in their contributions.

The Thousand Pounds Coke Competition.

Our contemporaries in France, Germany, Holland, and America have published information regarding the coke competition; and inquiries have been made for further particulars from friends abroad. These have been given. The conditions were fully set forth in the "Journal" for Feb. 18; and references to other information which has been sought have since appeared in our columns. We hope all who are working at contributions will remember that the last day for receiving them at this office is June 30. We want as many papers as possible in each of the three sections. A wag asked us the other day who would be the winner of the £200 prize. The members of the Committee will not know who is the winner of that or any other of the prizes until after adjudication of the last of the contributions. Not till then will be opened the sealed envelopes containing the names of the competitors. We might take the

opportunity of mentioning that a paper must only have a *nom de plume* at the top; and the *nom de plume* must be on the outside of the sealed envelope. It would also be an additional safeguard if repeated on the sheet of paper enclosed in the envelope which bears the name and address of the competitor.

Electricity for Gas-Works Purposes.

In the "Journal" for March 18 (p. 662), reference was made to the action of the Ministry of Health in consulting the Electricity Commissioners as to including in a loan applied for by the Goole Urban District Council for gas-works extensions an amount for the provision of electricity generating machinery for plant operation. The Commissioners advised that the Council should take their supply from an electricity supply company. The National Gas Council advised that intervention in such a matter by the Electricity Commissioners should be resisted. We are pleased to learn that the Council have received information that the Ministry of Health has since unconditionally granted the necessary sanction to the Goole Council.

More Capital Wanted.

It is a change to see once more the name of Lt.-Col. E. Eaton, "C.E.," figuring on a prospectus with which 43, Cannon Street, is identified. The Chagford and Devon Electric Light Company, Ltd., require "additional extension capital," and Eaton's name appears on the prospectus in association with the useful baronet—Sir Charles B. H. Soame—and Mr. R. G. Harley as Directors. The perennial officials, Walter Thompson, Solicitor, and Turner & Co., the Auditors, are also there. The Company have opened the mouths of their coffers to wide dimensions. The offer of Chagford and Devon (why should Chagford come before the county?) capital is only for £12,500 of cumulative preference shares of £1 each, for which a premium of 1s. is required; and £15,654 ordinary shares at £1 each, which are entitled to "91 p.ct." of the balance of distributable net profits. Apparently that £28,000 odd will not be enough for the new business to be done at Chagford, as a "limited number" of 7½ p.ct. first mortgage debentures are also waiting acceptance by anyone who is willing to part with his or her money. The Lighting and Power Finance Corporation, Ltd., part of the 43, Cannon Street machinery, are making this offer. A great point is made of the fact that the Company are utilizing water power, and that the Directors have concluded an agreement for supplying in bulk electricity for light, heat, and power. With whom this agreement has been made, is not stated; and no figures are given as to existing business—actual consumption, revenue, profits, &c. A very artful statement is made in a circular accompanying the prospectus: "The possibility of the undertaking being bought out by a larger concern must not be disregarded, in which event considerable capital profit may accrue, and in particular to the ordinary shares, which, after payment out of the yearly net profits of 9 p.ct. to the preference shares are entitled to rank for dividend in the balance of net profits—viz., 91 p.ct." At the top of the prospectus appears the words: "Every application will receive consideration as far as is possible." Of that we have not the slightest doubt. Another copy of the prospectus of the South Midlands and Berkshire Electric Light and Power Company has also been received from a gas shareholder.

Coal Shipments and Values.

In March there was a little more activity compared with February in the coal export trade, but not enough to make those engaged in it any more lighthearted when the figures and prices are compared with those of the corresponding months of last and the previous year. The total quantity exported in March was 4,392,258 tons, while in February 4,344,008 tons were shipped. In the corresponding month of 1924, the amount exported was 5,190,265 tons, and in that of 1923 7,180,102 tons. The values of these quantities were: March, 1925, £4,557,002; 1924, £6,390,574; 1923, £8,817,851. Gas coal shared in the slightly increased activity; the quantity shipped during the month being 600,104 tons, as compared with 568,966 tons in February. The shipments of gas coal in March, 1924, were 687,358 tons, and in 1923, 866,607 tons. The value of the gas coal shipped last month was £603,672, which gives an average per ton of £1 0s. 1·4d., or 5d. less than the average for the gas coal exported in February. Taking the first three months of the year, the total quantity of coal sent abroad was 13,102,317 tons compared with 15,705,950 tons in the corresponding period of 1924, and 18,694,402 tons in that of 1923. Of these quantities in the first quarter of this year, 1,720,846 tons was gas coal. This compares with 1,981,846 tons in the first quarter of 1924, and 2,290,790 tons in that of 1923.

Gas Coke Exports.

There was also rather a better showing in regard to gas coke last month, as compared with February; the respective figures being 52,658 tons and 41,714 tons. In March, 1924, 76,826 tons of gas coke were exported; and in the same month of 1923, 93,865 tons. The value of the gas coke shipped last month was £76,400, which works out to an average of £1 9s. 0·2d. per ton, which is close upon 1s. 7d. less than the average per ton for February. The value of the quantity exported in March, 1924, was £136,708, and in 1923 £144,777. In the first quarter of this year, the total shipped was 158,178 tons, which is rather less than half the quantity sent overseas in the corresponding period of 1924, when it reached 326,455 tons. In the first three months of 1923, the amount of gas coke shipped was 294,553 tons. The values were: For the first quarter of this year, £240,085; 1924, £569,361; 1923, £428,941.

Sulphate of Ammonia Shipments.

Last month the amount of sulphate of ammonia sent abroad was 19,198 tons, as against 26,321 tons in March, 1924. For the first three months of this year, 79,607 tons were shipped, as compared with 87,258 tons in 1924. So far, therefore, we have not succeeded in maintaining the quantity of business done abroad in the first quarter of last year. The best customer up to the present is Spain and the Canaries; the quantity taken by them being 28,699 tons in the first quarter of this year, as compared with 16,439 tons in the corresponding period of 1924. The Dutch East Indies has been the next best customer with 14,474 tons, and Japan follows with 14,182 tons; but last year in the same period Japan bought 32,755 tons.

Coal Tar Products.

In March the export of benzole showed a distinct upward move; the quantity being 53,041 gallons, as compared with 13,246 gallons in March, 1924. But in the first quarter of last year considerably more than twice the quantity was shipped, contrasted with the first quarter of this year; the respective figures being 252,749 gallons and 115,521 gallons. Of naphtha last month, 3463 gallons were sent abroad, as against 4638 gallons in March, 1924. The shipment of naphtha for the quarter was 10,895 gallons, as against 49,797 gallons in the corresponding period of 1924. Taking together tar, oil, creosote, &c., no less than 3,063,280 gallons were sent abroad last month, compared with 2,234,298 gallons in March, 1924. In the first three months of this year, the total quantity exported was 10,828,946 gallons, as against 9,513,748 gallons in the first quarter of 1924.

Gas Oil Imports.

In March 5,721,410 gallons of gas oil were imported, as compared with 3,614,176 gallons in March, 1924. In the first quarter of the year, the total quantity of gas oil imported was 16,250,811 gallons, which contrasts with 16,103,496 gallons in January-March, 1924—a small difference.

Anti-Eczema Soap

As the result of careful research, Messrs. F. & E. Stanton, Ltd., of Lewisham, London, S.E. 13, have been successful in producing an anti-eczema emulsion, and experimental work has enabled them to convert this into a firm, hard, anti-eczema soap, which will not only prevent gas eczema breaking out upon gas workers, but will also cure those who are suffering from it. The firm inform us that they will be pleased to post, free, a 2-lb. sample bar of the soap upon receipt of a post-card from any gas manager or engineer, so that a test may be made of its virtues.

Institution of Civil Engineers.—An Extra Meeting will be held on Wednesday, May 6, at six o'clock, of the various bodies which are co-operating in the work of the Special Committee on Tabulating the Results of Heat-Engine Trials. Mr. J. Carnaghan will introduce the following subject for discussion: "A Standard Code for Tabulating the Results of a Heavy Oil Engine Trial." Capt. H. Riall Sankey, C.B., C.B.E., Chairman of the Committee, will preside.

PERSONAL.

Among recently elected members of the Society of Chemical Industry is Mr. Jacques Abady.

At a meeting on the 21st, Alderman Frederick Joseph West, C.B.E., Lord Mayor of Manchester, was elected a member of the Institution of Civil Engineers.

Mr. Alexander Young, Gas Manager at Tayport, has been appointed Engineer and Manager of the gas undertaking at Bridge of Allan. Educated at Arbroath High School, Mr. Young served his apprenticeship with Messrs. Shanks, of Arbroath. Later he obtained the position of Chief Draughtsman at the Dundee Gas-Works, whence he went to Tayport.

Many readers will be interested to learn that Mr. R. L. Wilson, who has for a number of years occupied the position of Commercial Manager to Messrs. J. Brown & Co., Ltd., manufacturing chemists, of Savile Town, Dewsbury, has been appointed a Director of the Company.

OBITUARY.

In the early part of this month Mr. A. Jacob, Manager of the British Aluminium Company, Ltd., died at Hatch End, Middlesex, at the age of 57 years.

We regret to learn of the death, on the 18th inst., at 93, Morningside Drive, Edinburgh, of the wife of Mr. James O. Scott, of Messrs. Alder & Mackay, Ltd.

ELECTRICITY SUPPLY MEMORANDA.

Some of the circulars issued by electricity supply undertakings regarding electric cooking and heating are probably more interesting to those who understand, than to those who have not the knowledge to estimate, the value received for a given expenditure. We have before us some circulars on the subject sent out by the Great Yarmouth Electricity Supply Department. The first one tells us that in response to an increasing demand from electric lighting consumers who are desirous of taking advantage of electric cooking and heating, the price for current has been reduced to 1½d. per unit (flat rate) for those purposes, or 1d. per unit for all purposes, *plus* a lump payment equal to 20 p.ct. on the rateable value of the premises, *plus* a rent of £1 a year for a No. 19 cooker, 24s. a year for a No. 20 cooker, and 28s. a year for a No. 22 cooker. The householders of Yarmouth who desire to take advantage of electric cooking and heating may find that these processes will take advantage of them. There are two points into which the householder should inquire. One is, Why do the electricity people have to charge 1½d. per unit for cooking and heating, while so much more is charged per unit for lighting? And, Why do they talk about 1d. per unit for cooking and heating under the rateable value system, when there is also the 20 p.ct. in this instance to be divided over the consumption to find the average total cost per unit? They will reply that they want to encourage a day load, and to induce this they charge a low price. But it must be apparent to the poorest of intelligences that if there were the savings and merits about electric cooking that are so lavishly spoken of and circulated, there would be no need for such low prices per unit. The fact is that the potential heat energy in a unit of electricity is so meagre—3420 B.Th.U.—that expediency compels a small charge in order to make any show (even then it is of a remote order) in the competitive field. That is the point to which the attention of householders should be directed—in other words, they should be informed of the modest heat value of a unit of electricity in comparison with the value to be purchased at the same price through other heat agents. That is a matter on which these circulars for the "information" of the householders of Great Yarmouth are as silent as the grave. It would, of course, be a strategical blunder for electricity purveyors to say anything about the matter. What is said is that "the electric method is extremely simple, and requires no previous experience—a point which cannot be too strongly emphasized in view of the misconception which appears to exist in the minds of many people." It is not the method that is extremely simple; it is the householder who believes that it is—for the "simple method" is the seat of several weaknesses, to which it is constantly succumbing to the inconvenience of the user, and which then call for rectifying expert attention. So real is the uneconomy through hotplate inefficiency, and so pronounced are the limitations and the troubles, that we see in the Department's circular that "no stove will be let for a shorter period than twelve months." It is in the circumstances a necessary safeguarding condition.

Yarmouth and the Cooking Load.

Plausible Tales and Incontrovertible Facts.

But we were on price. It is the custom in some areas to trot out consumers' low accounts for electricity for cooking and heating in comparison with gas. It should be pointed out to householders that these are nothing to go by. Such testimony misses out the important factor of work done; the work done must be equal if there is to be any true financial comparison. Householders should also have impressed upon them that a gas therm equals 100,000 B.Th.U., while a unit of electricity equals only 3420 B.Th.U. Therefore 100,000 ÷ 3420 = 29 units of electricity. Any intelligent householder must see when the matter is brought to his notice that—with a slightly higher thermal efficiency in the electric oven than in the gas oven, but with a higher efficiency on the hotplate of the gas-cooker than on the electric hotplate (75 to 80 p.ct. of the work done by a gas-cooker is carried out on the hotplate)—it is impossible, equal work being done, for the electric cooker, in view of the heat value delivered for a given expenditure, to match the gas-cooker for economy. Consumers with these facts before them will realize why in their struggles to secure heating and cooking business the electrical people have to get down to low prices per unit; even then the thermal value given for money expended is distressingly poor. Just as one cannot get out of a jug more liquid than it will hold, so one cannot get more heat out of a unit of electricity than it can generate. But the electricians make out a plausible tale which, without investigation, may deceive many people.

Charges and Costs.

It would be interesting to know how the flat rate of 1½d. per unit for heating and cooking is justified in Great Yarmouth. It is stated that 230 cookers were placed as the result of the Industrial Trades Exhibition held in March last; but the load from these (assuming they are all retained in constant use, which is very doubtful) cannot warrant a price per unit less than the average of the generating costs, let alone the total expenditure, per unit sold. In the year ended March 31, 1924, the current sold for all purposes amounted to 2,694,892 units; and the total cost per unit sold was 2·8d. This was made up as follows: Generation, 1·88d.; distribution, 0·3d.; rents, rates, and taxes, 0·18d.; and management, salaries, printing, stationery, and miscellaneous charges, 0·44d. From this it will be seen that the 1½d. per unit on the flat rate is 0·38d. below the average generating costs per unit, and as much as 1·3d. below the average of the total costs. As to the rateable value system, an illustration will show that in some—perhaps most—cases the revenue per unit will fall short of the average expenditure, although the fixed charge is supposed to cover the standing costs incurred in supplying the consumer. Take a house rated at £50; the fixed charge is to be 20 p.ct. of that, or £10 per annum, which reduced to pence is 2400d. One of the circulars tells us that the electricity consumed for cooking averages 1 unit per person daily. Therefore, supposing there are six persons in a household, this would be 42 units a week. Let us add 8 units a week for lighting and incidentals—seeing that we may be sure the makers of the cookers have not over-estimated the consumption at 1 unit per person a day—this would make 50 units per week, or 2600 per annum at 1d. Adding to this the fixed charge of 2400d., we have 5000d. to be divided by the 2600 units. This works out to 1·92d. per unit. If the householder's consumption is more, it would work out to still less; yet the total charges to which we have referred average 2·8d., and the generating costs 1·88d. This is municipal trading; it is the grossly unfair trading with which gas undertakings are called upon to compete. There is no justification for it. It is also totally unjust to the man who prefers electricity for lighting and gas for cooking. Why should he pay three or four times as much per unit for lighting when the man in our illustration with the cooker can, during lighting hours, both cook and light at a cost of 1·92d. per unit, or 0·4d. above the bare generating costs for the year ended March, 1924. He might be advised to go on to the rateable value system; but would it pay him, with his house rated at £50, if he prefers electricity for lighting only? Flat-rate lighting consumers are, through the revenue they produce, the backbone of electricity undertakings to-day. It is only through their revenue that electricity concerns are able to indulge in these fantastic schemes of making a fixed charge upon rateable value or floor area of rooms (with an additional low charge per unit), instead of upon the actual electrical requirements. However, we may be sure the Gas Company will show the inhabitants of Great Yarmouth that the thermal value supplied by them far exceeds for a given expenditure the poverty-stricken value offered by the Electricity Department.

An Investigating Committee and Domestic Consumption.

A sane and sound electrical tariff to displace the flat rate, with discounts for good loads, is something which, it is admitted in the electricity industry, its men have not yet achieved, despite a wonderful aptitude for arithmetical gymnastics, as instanced in the "Memoranda" last week. There has been a great deal of advocacy of the two-part tariff, of the rateable value form. In

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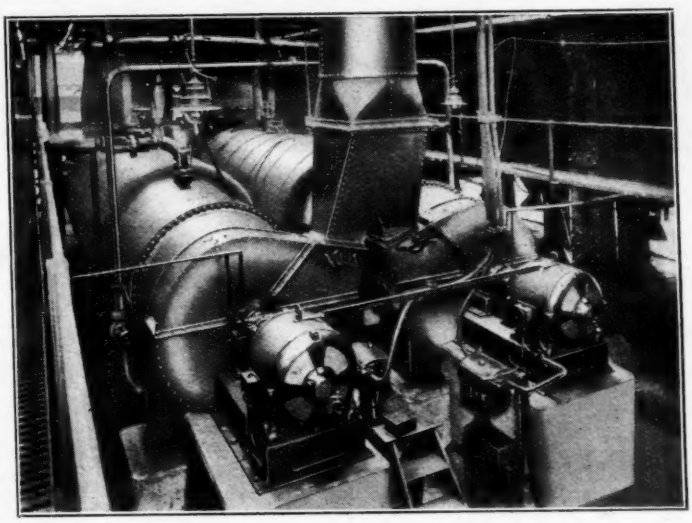

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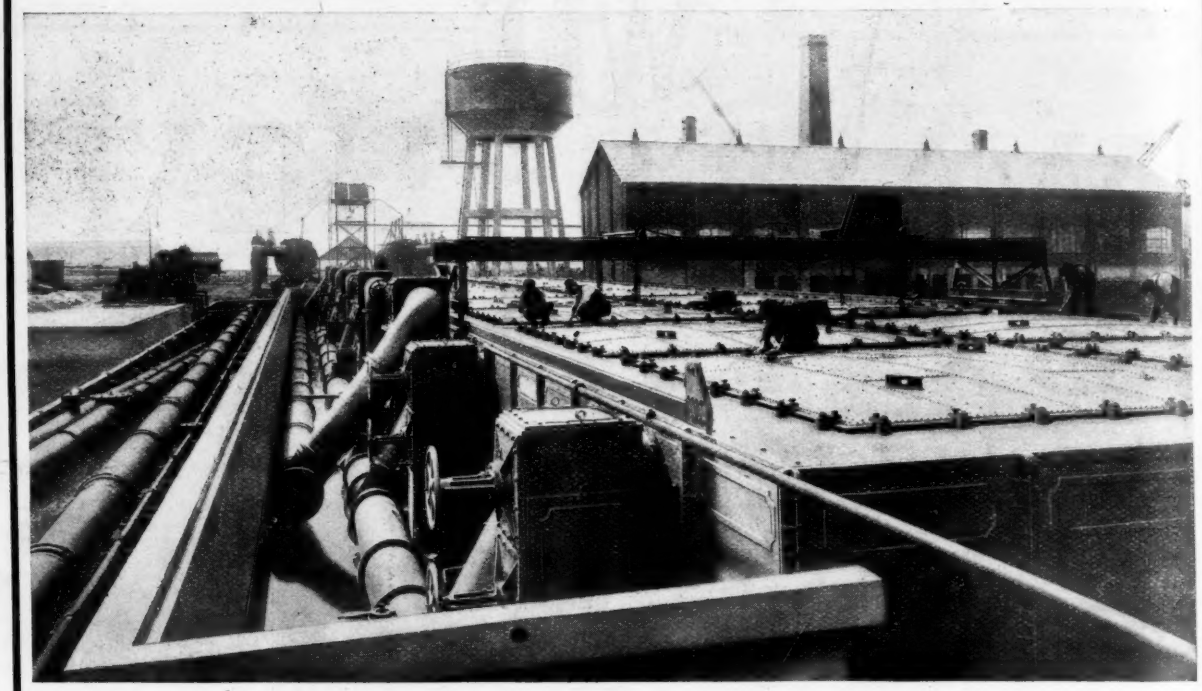

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the Act of 1922, power was given to the Electricity Commissioners to supersede the flat rate where they were satisfied with proposed alternatives; but in their last annual report, they stated that very few applications had been made for permission to adopt a new system. Now the Commissioners have appointed an Advisory Committee to report on certain questions affecting the use of electricity and the methods of charging. Allusion is made in our editorial columns to the points which have been referred to the Committee for consideration and report. But here it may be mentioned that the Committee represents various organizations in the industry, and is constituted as follows: Messrs. J. W. Beauchamp (Chairman), S. T. Allen, and A. N. Rye (representing the British Electrical Development Association), Messrs. J. S. Highfield and W. B. Woodhouse (representing the Incorporated Association of Electric Power Companies), Messrs. A. C. Cramb and W. C. P. Tapper (representing the Incorporated Municipal Electrical Association), and Messrs. H. Bentham, F. E. Gripper, and K. A. Scott-Moncrieff (representing the Provincial Electric Supply Committee of the United Kingdom).

The "Safety" of Electricity.

Within a week there were three disconcerting street explosions—at Keighley, York, and Falkirk. At the first-named place an electric cable misbehaved itself not only by fusing, but by melting a gas-pipe. The cable it is stated was twenty years old, and was encased in a cast-iron pipe instead of the usual earthenware conduit as is the modern practice. At both York and Falkirk, the explosions caused manhole lids to make a swift flight in the air, and caused other unpleasant commotion. These incidents appear to be getting more and more frequent; and this suggests that there are towns where a good deal of old distributing material should be replaced by new, laid in the most approved style. Electrical men have dropped talking about town gas leaking into their culverts, because advancing knowledge has taught them that a more potent explosive can be generated by their own systems. From explosions to fires. One was caused in the early hours of last Monday morning at the works of Messrs. Needlers, Ltd., chocolate manufacturers, of Sculcoates, Hull. Coming when the week-end closure had almost expired, the only explanation is electrical fusion; and a curious thing is that it was a man who was on duty at the Corporation electrical power station who, just before two o'clock in the morning, noticed a small flickering flame in the upper storey of Messrs. Needlers' premises. Within ten minutes that small flickering flame became a raging fire owing to the combustible character of the boxes and wrappings in the part of the building where the fire broke out. From fire to failure. Oxford was thrown into partial darkness during the evening of last Saturday week. It would have been plunged into complete darkness had it not been for the fact that the gas undertaking of Oxford flourishes, and it has a good share of the lighting custom. Candles came into temporary popularity.

Compulsory Powers Rejected.

A short time since attention was called in the "Journal" to a Bill which Mr. Harris intended to introduce into the House of Commons for the purpose of increasing the powers of joint electricity authorities. It will be remembered that, when the legislation of 1919 was under the consideration of Parliament, in order to save the Bill, and obtain power to establish the Electricity Commissioners, it was found necessary to delete the compulsory powers. Since then, certain joint authorities have been set-up; but through the want of general agreement in the areas they have not been able to function in the manner originally intended. Some people consider that this is due to the absence of compulsory powers; but as a matter of fact there is a mass of opinion in the industry itself that there should be no compulsion in this matter—that every electricity supply authority should be allowed to take the course which it considers most desirable in the interests of its own undertaking and area. Those who do not concur in this opinion hold that electricity supply should have a national or extensive territorial base. But we have much sympathy with those local authorities who believe that in being pooled, and averaging the costs in respect of generation and transmission, they would not be in such good position as they are by generating for themselves and supplying in a densely-populated area—particularly those industrial in character. Just recently, Mr. Harris moved for leave to bring in the Bill for conferring upon joint electricity authorities the compulsory powers which were deleted from the Bill of 1919. There was a strong opposition to this, which was led by Mr. Austin Hopkinson, whose opinion was that it would be a mistake to do anything which would stereotype the industry and set the dead hand of the State on technical progress. It is Mr. Hopkinson's belief that miraculous changes will in time take place in respect of the methods of electricity generation—in fact, his idea is that, towards the end of the present generation, we shall see the direct production of electricity by the oxidization of coal in some form of carbon cell. He believed that the Bill to confer compulsory powers on the joint electricity authorities would be disastrous to technical progress. The Bill was rejected by 193 votes to 124.

CENTENARY OF THE SOUTH METROPOLITAN GAS COMPANY.

A Volume Worth Preserving.

When, as rarely, people reach a century in life, their friends desire to felicitate and rejoice with them. When large concerns have passed through a century in business, custom prescribes a celebration of the event. Such an anniversary cannot occur again in the lives of anyone associated with the enterprise. Therefore those responsible for the administration of such businesses may be pardoned for indulging in a little celebration and rejoicing, when they may receive from their friends their cordial wishes for continued and still greater progress in the future. In the case of the undertakings of the gas industry (to which we are all proud to belong), there is good cause for congratulation on the ground of past achievement, because they have worked well—not only in times that have been good, but in periods of great tribulation. They have never made a backward movement; they have always gone forward in the development of their businesses, and therefore in public and national service.

The hundredth anniversary of the birthday of the South Metropolitan Gas Company was May 28, 1924; but, through various circumstances, the Directors decided not to have celebrations in connection with the event, but quietly to pass the time as though it was an ordinary occurrence. The decision, however, was accompanied by the resolve to commemorate the completion of the century's work by having a volume prepared briefly surveying the history of the Company, the large expansion of the operations of the concern, and the important part it has taken in the political and technical advance of the industry.

The volume before us is entitled "A Century of Gas in South London." The literary work is good. It is something more than a mere historical sketch. It is so written that it immediately draws one into the life and activities of the Company. It is a book probably rather for the non-technical reader than the gas technician, yet the gas technician who begins to read will want to continue until he has completed the 23 pages of text into which has been compressed a whole century's history of a concern which has ever been adding to its laurels—administratively, technically, and commercially. The illustrations are excellent; and at the end there are a number of portraits of men who have been prominently identified with the Company, and, through the Company and in other spheres, with the gas industry. We shall prize the portraits, because all of them—excepting two—are of men we have known or do know, and whose friendship has been invaluable. We congratulate the Company heartily on the volume.

To return to its literary part. An idea of how the author has managed to present interesting detail in a manner which will appeal to the popular mind, can at once be given. He is dealing with the vast network of pipes under the soil of South London streets; and he says:

> The mains alone are 1340 miles in length; the area under which they spread covers 52 square miles. This network serves about two million people; some 400,000 meters measure the gas which the Company supplies to its customers. We cannot call it a monopoly, even within its own area; yet it maintains an easy supremacy. Its electrical competitor who used to boast that electricity had antiquated gas, can only muster a fraction of its consumers. It is a hundred years old; yet it has not stopped growing. It expands with the population it serves, and develops with the development of industry.

And then we come to a description of the Company's activities. It is pointed out how rigorously gas is tested for its lighting and heating powers, as milk is tested for its fats, so that the Company protects its own customers against the possibility of adulteration. It supplies, in fact, a standard article at a standard price. And then there is reference to the subordinate industries; to the fact that the Company has its own laboratories, both chemical and industrial. It has its own research department, and makes its own gauges and standard burners. It has three chemical works dealing with its own bye-products. It produces 11½ million gallons of tar and 47 million gallons of ammoniacal liquor in a year. Indication is given as to the applications of the products derived from the distillation of coal. Following these impressive facts, are others no less suggestive. The capital of the Company amounts to 9½ millions sterling; and a regular dividend is distributed to 18,000 shareholders. Some 8000 workers are employed; and yet the Company is untroubled by industrial strife. "In this great organization of workers and capitalists, there reigns profound and perpetual peace, undisturbed even by a threat of hostilities. In this era of industrial unrest, such an equilibrium must be counted remarkable; and the system which has brought it about should be well worth our study."

With such facts in mind, one naturally seeks to know more of the history of this concern; and a page or two later we come into contact with the origin of the Company.

> In 1814 the first gas-works on the South Bank of the river were constructed at Southwark by an enterprising Scot called Munro. These were sold a few years later to the South London Gas Com-

pany, which was in difficulties before 1824, when the struggling enterprise was taken over by some optimists who called themselves the Phœnix Gaslight and Coke Company. With this Company properly begins our story, for in the course of time the Phœnix came to its last roosting-place inside its rival, the South Metropolitan Gas Company.

The Company had a distinct aristocratic parentage; for one of the original proprietors mentioned in the Special Act of 1924 was the great Lord Holland, who, by the way, was a Fellow of the Royal Society, had been Lord Privy Seal, and was to become Chancellor of the Duchy of Lancaster. Among others were the Hon. James Abercromby (afterwards Speaker of the House of Commons), Baron Dunfermline, Thomas Fowell Buxton (a leader in prison reform and anti-slavery), John Petty Muspratt (a Director of the East India Company), and Charles and David Barclay and Frederick and Charles Perkins (presumably the brewers). Thus the Phœnix Company began strongly; and it had, besides, a five years' start of its rival, the South Metropolitan Gas Light and Coke Company, which was founded in 1829. The latter Company, unlike its other competitors, gave the river a wide berth, and chose for the site of its operations 3 acres of land along the Grand Surrey Canal on the eastern side of the Old Kent Road. There, by 1833, the works were completed, and thenceforth began a long and stern fight between the two companies, to end inevitably in amalgamation.

It is noteworthy, in view of the practices of to-day, to remark that:

> The South Metropolitan Company started operations in the good resolution to supply the public with a pure article, and to that end built a purifying-house which was a model of all that such a house ought not to be. Its windows were glazed; there was practically no ventilation; and it is surprising that it lasted so long as until 1836, when it was completely destroyed by an explosion. In its determination to make good gas, the Company used only cannel coal; but the high cost of this raw material forced up the price of the finished article to 11s. per 1000 c.ft., whereas the Phœnix Company was selling its product at 9s. In 1834, the South Metropolitan Gas Company was proudly informing the world that "the purity and illuminating power of our gas are such that 3000 c.ft. will burn as long and give as great a light as 5000 c.ft. of the gas of the Phœnix or any other Metropolitan Gas Company."

With competing companies in the area, the South London supply suffered greatly through its roads being constantly torn to pieces, as well as through plumbers and gas fitters advising innocent householders to take one company's gas or another as their interest in gas fitting and public lighting prompted them. The public suffered, until at length, in 1853—mainly through the policy of Mr. Thomas Livesey—a general peace was concluded, defining the sphere of influence of not only the South Metropolitan and the Phœnix, but of a later competitor, the Surrey Consumers' Gas Company. This "districting agreement," as it was called, shows that here as elsewhere the Company was in advance of the State; for, although the advantages to the public were enormous, it was some years before the House of Commons could be brought to consent to give it statutory sanction. The agreement was the beginning of a movement to amalgamate the various companies which divided South London between them. The first step was taken by the Phœnix Company, which approached the Board of its principal rival in June, 1870. On July 1, 1879, the Surrey Consumers' Company handed over their premises; on Jan. 1, 1880, the Phœnix Company came in with its works at Bankside, Vauxhall, and Thames Street, Greenwich; and in 1885 the two small Woolwich companies became part of the large concern. Thenceforth the South Metropolitan Gas Company held undisputed sway over practically the whole of what is now London County south of the Thames (except only two small areas)—a territory of 52 square miles, stretching from Abbey Wood in the east to Tooting in the west; and from the banks of the Thames southwards to Streatham and Bromley Hill—a densely populated area containing approximately two million people.

The volume gives an insight into the legislative restrictions which were imposed upon the Company. But despite these, and the competition of electricity, the Company, strong in its position and its resources, has triumphed both technically and commercially in the manner already indicated at the commencement of this review. Its history is interleaved—perhaps more than is the case with any other concern—with the legislative, technical, and administrative progress of the gas industry. The great record which it holds in connection with developments in legislation during the time of Sir George Livesey—particularly in respect of the sliding-scale—is matched by the many important technical developments which have been made in engineering (as witness the 12 million c.ft. gasholder), and through its chemical, physical, and research laboratories during the more immediate years. The history, too, of the Company cannot be referred to without allusion to the great strike which accompanied the introduction of profit-sharing by the Company, which has since developed into real co-partnership in administration, participation in profits, and stockholding by the employees. It was a great innovation, and the example, followed by many other gas companies, has given to the industry an incomparable place in respect of labour in the industrial world.

From the momentous year of the birth of profit-sharing or co-partnership in the industry, there has not been as we know, and as the volume before us states, "even the hint of serious trouble with the Company's workmen." How much under the co-partnership scheme the men have received in actual money since its inauguration is not stated; but the fact is on record that the stock of the Company held in the name of the workers amounts to-day to between £400,000 and £500,000. In this connection we should like to quote two or three passages from the volume:

> One result of the scheme was to give the industry freedom from industrial disputes; another was to induce every workman to take an interest in the success of the undertaking. Before he had been merely an employee, now he was a partner, and an increase of sales or an economy in working assumed a new and personal aspect. The public felt the change in the zeal of the outside staff; the engineers in the zest of their artisans. But there were other and higher advantages which showed themselves as the policy developed. Out of co-partnership grew a corporate sense, an administration in which all shared, and by which all were educated in mutual help and brotherhood. A Co-partnership Committee grew out of the joint interests of employer and employed. It consists of about seventy representatives—half elected by ballot of the co-partners, and half of officials nominated by the Board of Directors. The Committee meet every month, or more often if required; and the week before the meeting the workmen's half of the Committee hold a preliminary conference to consider matters they desire added to the *agenda*. As every department is represented, there is a channel through which every employee can ventilate his troubles, and on the side of the management there is a channel through which their ideas can reach the employees. "On the one hand," says Dr. Carpenter,* "we have difficulties, troubles, modifications, suggestions, proposals, recommendations, as the case may be—all flowing from the workpeople through the Committee to the management; and from the management information of all kinds which it desires to disseminate among the workpeople as a whole. The Committee is, in fact, a small-scale Parliament of Labour, with business-like habits and a directness of action which would do credit to its prototype." Such a body is well equipped to smooth out differences before they reach a danger point.

The centenary volume also gives an account of the large, but unobtrusively performed, war work of the Company; and we read:

> In these days when our industrial system is being attacked as decadent and obsolete, such a record as this might serve to answer its critics; and it might be noted for such an argument that these achievements are not the work of an impersonal thing called Capital (although Capital on a great scale was a prime necessity of the undertaking), but of men, or rather of a line of men, who did not exploit, but rather led, labour in the conquest of an element of Nature. The record proves that the brains, courage, and experience of the employer are essential to the success of an industrial enterprise. We have seen how the line of Livesey began in the childhood of the Company; how Thomas Livesey established the greatness of the Company which his son, George Livesey, developed. But the record would not be complete without at least brief mention of the successor of these two men, Dr. Carpenter, who was Engineer of the Company when George Livesey died, and who is now its President and Chairman of Directors. On the death of George Livesey, Dr. Carpenter led the co-operative movement which gave industrial peace to the enterprise; he directed also the work of scientific investigation, in which he himself took the principal part, and created the machinery of research and experiment. There is hardly a leading improvement in the carbonization of coal and the production of gas in which the two Liveseys or Dr. Carpenter are not, in some way or other, connected. And the practical results of these researches, by the generous policy of the Company, have benefited not one enterprise only, but the whole gas industry.

Interest in the volume is maintained to the very end, and that end is compressed into the following passages:

> The carbonization of coal is obviously of vast importance to our national economy since its heat energy is resolved into useful forms with a much higher degree of efficiency than in the production from coal of steam and electricity. It is therefore not unlikely that our industrial development in this country will go along these lines, and that, by the scientific carbonization of our magnificent coal resources, we shall keep our place in the race against competitors who have the advantage in water power. In this national development, the South Metropolitan Gas Company has played an important part. The names of Livesey and Carpenter are associated with almost every process of the industry; and the Company has also led the way in the achievement of something no less important than gas production—peace between Capital and Labour. It has grown with its territory of South London; and at the end of a hundred years, it is entrenched in every road and installed in every house, and thus inextricably connected with the lives of the two million people it serves. This is so strong a position industrially and territorially that the Company, with its great record in the past, has good title to look forward with confidence to the future. Incidentally, it proves that what is called capitalistic enterprise is neither effete nor selfish, that it may live at peace with its workers, and may serve without exploiting its public.

The volume contains a considerable amount of interest concerning a Company which has had such conspicuous part and place in the making of history in our industry.

* "Industrial Co-Partnership," by Dr. Carpenter; 3rd edition, p. 47.

EASTERN COUNTIES GAS MANAGERS' ASSOCIATION.

HALF-YEARLY MEETING AT NEWARK.

THE first meeting of the Association to be held in Newark took place last Wednesday, when the members attended in very satisfactory numbers to do honour to their President, Mr. F. A. West, who is Engineer, Manager, and Secretary to the Newark Gas Company. The day was full of interest and enjoyment, as also was the visit to Chesterfield on Thursday.

The day opened with the reception of the members by the President at the gas-works, where they were able to see for themselves much of the good work that Mr. West has been, and still is, doing for his undertaking.

At the Gas-Works.

In anticipation of the visit, an illustrated booklet containing a history and description of the works had been prepared by Mr. West, from which the visitors gleaned much information. The Newark Gas Company was formed in 1832, and the original works were built by Mr. James Malam. The site of the present works, which is adjoining the original works, was purchased in 1883, and a new works constructed by Mr. T. Hawksley. The site is divided by a public roadway; the manufacturing and purifying plant being on one portion, and a holder and the distribution department on the other. From Jan. 1, 1924, the Newark Corporation took-over the undertaking; and the transfer will probably be completed this year.

A branch siding has been carried into the works from an adjoining L. and N. E. Railway coal siding. All the coal is obtained by rail; the trucks being shunted direct into the siding by the Railway Company. The coal is simply discharged from the trucks by bottom or side doors into an underground hopper, which discharges into a four-roll breaker, and elevated by a 20-ton an hour bucket elevator on to a band conveyor, which discharges into the overhead hopper in the retort house. This hopper holds about 24 hours' supply. A by-pass shoot has been arranged in the breaker pit to by-pass small coal which does not require breaking, and a two-way shoot has been constructed at the top of the elevator, so that in the future coal can be discharged on to conveyors for trimming coal into stores. The coal stores adjoin the retort house. Provision is made for about one month's winter requirements, half under cover and half in the open.

The carbonizing plant consists of four beds of eight retorts (Drake's settings) arranged in four tiers, with a blank arch for future extensions. The retorts are 23 in. by 16 in. by 20 ft. long, and arranged with 7-in. ascension pipes both sides of the beds. The dip-pipes are fitted with Cort's anti-dip valves; and the hydraulic mains are separate and fitted with the ordinary tar towers, each side of the bench. The foul mains, which are 18-in. diameter, converge into one common main at the end of the beds; and a Cowan retort house governor regulates the vacuum on the retorts. Charging and discharging the retorts is carried out by a Guest-Gibbons combined machine.

Hot coke is removed by a side-tipping wagon running on rails and hauled by an endless rope and electric motor. This is controlled by a tramway-type controller in the retort house. After it is quenched, the coke is drawn up an elevated gantry, and the wagon automatically tips either into the coke bunker or at any desired spot in the yard. Another transporter running at right angles, and electrically driven, conveys coke from the bunker to railway wagons. This transporter is also used for storing coke when required.

There are 750,000 c.ft. water-tube condensers, fitted with 18 in. connections. The exhauster house contains two sets of exhausters—one 50,000 c.ft. per hour by Messrs. Bryan Donkin, and the other 40,000 c.ft. per hour by Messrs. Geo. Waller & Son. The exhausters are direct coupled and steam driven. There are also two Evans ammoniacal liquor pumps for circulating the liquor round the works, and an Evans reversible tar pump for filling tank wagons at the sidings. There are two tower scrubbers 40 ft. high and 10 ft. diameter, filled with wood boards on edge. One is used with ammoniacal liquor, and one with clean water. There is also a Livesey washer, with a capacity of 1 million c.ft. per day.

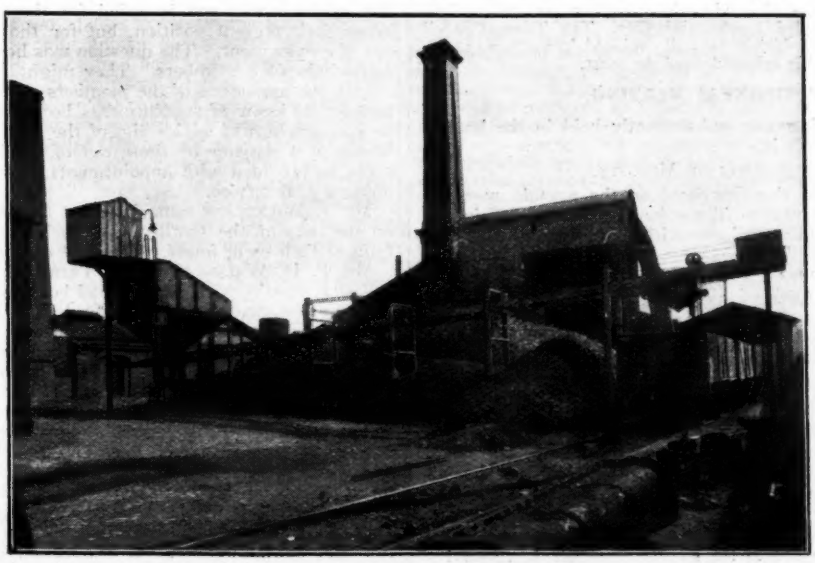
The purifiers consist of eight boxes: Four small water-lute purifiers 10 ft. by 15 ft. (worked as two, the gas dividing into two streams); two luteless boxes 20 ft. by 15 ft. (all under cover, and worked by a patent Saddler-Cockey centre valve, allowing one, two, three, or four boxes to be in operation at once); and two boxes in the open, 25 ft. by 25 ft. by 5 ft. 6 in. deep, operated by a Weck valve, at present acting as catch boxes. Ultimately there will be added two more purifiers of the same capacity, to form the main purifying plant, with the two smaller luteless purifiers used as catch boxes. The method of working is the backward rotation system; all the boxes being in operation. The oxide in the larger boxes is changed once a year, and put in the boxes in one layer only. The portable oxide disintegrator is capable of dealing with 2 tons of oxide per hour, and is direct driven by an electric motor.

The station meter is a Venturi meter by Messrs. Geo. Kent, Ltd., and has a capacity of 60,000 c.ft. per hour. The town governor is housed in the same building, and is an 18-in. governor, made by the Gas Meter Company. The building also contains all the works gauges, recording and direct reading, the recording calorimeter, &c.; the general arrangement making a central control room.

The water gas plant house contains two sets of Tully plant, each of 300,000 c.ft. capacity. One is fitted with a carburettor for lightly carburetting with oil; Hodges steam turbine blowers in duplicate are used for the air blast; and there are two circulating pumps and a vertical Marshall steam engine, for driving the elevator, in the engine house adjoining. Two scrubber condensers and a Livesey type washer are used for cooling and washing the gas.

The tar and liquor well is constructed at the end of the retort house; and an overhead cast-iron tank is used to store tar. A tar dehydrating plant was erected out of old material on the works, and is very simple and efficient. There are three holders—No. 1, 530,000 c.ft. capacity, with flying lift; No. 2, 175,000 c.ft. capacity; and No. 3, 100,000 c.ft. capacity (the relief holder for water gas).

There are two Lancashire boilers, adjoining the engine house. They are 7 ft. diameter and 27 ft. long, fitted with Wilton forced draught furnaces. The boiler house is equipped with a Lassen and Hjort water softener, two boiler feed pumps, and a feed water heater. The electric generating plant adjoins the boiler house and exhauster house, and consists of one 16 KW. set, direct coupled to a "National" gas engine; and one 25 KW.



COKE HANDLING PLANT.

set, direct coupled to a vertical compound Sisson engine. In this room is also housed a small Bryan-Donkin compressor for atomizing a suitable paraffin for naphthalene. There is a panbreeze washer of a new type, very simple and effective, operated on the flotation principle, and made locally by the Midland Iron-Works Company, Ltd.

A fully equipped laboratory has been provided; and there are meter repairing and fitting and stove cleaning shops.

Town water is used in the condensers, and then passed to a water softener, after which it is used in the boilers. A well in the works supplies the water for quenching coke; the waste being recovered and employed over again. This water averages 60° hardness, and is not suitable for boilers.

The offices are at the works. A new showroom has recently been opened in the Market Place. A full assortment of appliances is on view, and consumers have proved that they fully appreciate the convenience of a central showroom.

Luncheon.

Subsequently a move was made to the Clinton Arms Hotel, in the Market Place, where the visitors were the guests at luncheon of the Chairman and Directors of the Newark-on-Trent Gas Company. Between fifty and sixty sat down, under the chairmanship of Mr. O. Quibell, F.C.S., J.P. (the Chairman of the Company). He was supported by the majority of the Directors and of the members of the Town Council, who, as already stated, have agreed to take over the undertaking. Among the members of the Association, many old friends were found; while the visitors included Mr. Walter Dunn (Secretary of the Institution of Gas Engineers) and Mr. W. M. Mason (Manager of the British Commercial Gas Association). After the honouring of the Loyal Toast,

The Chairman said it was a great pleasure to him, on behalf of the Directors of the Newark Gas Company, and of the Committee of the Town Council (who would manage the gas-works when they had taken possession of them), to welcome the Association to Newark. The pleasure was all the greater in view of the fact that Mr. West was their President. The members probably knew and appreciated Mr. West as much as they in Newark did. The Directors felt that they were under a great debt of gratitude to him. It was a fact that if gas undertakings prospered, then the communities they served would benefit from their prosperity. He had been looking over the old minute books of the Company, and found that they started with a capital of £5000, and that there were then eleven Directors. There was a minute proposing that the price of gas should be reduced from 10s. to 8s. 4d. per 1000 c.ft.; and a year or two later the contract price for coal was 8s. and 9s. per ton. The sum of £11 was received for a year's supply of ammoniacal liquor; and following this, £15 a year for seven years. The firm with which he had been connected had had the contract ever since then, with the exception of one year. Another item he came across was: "Unpalatable as the contents of this report must necessarily be, there are no grounds for discouragement. Uninterrupted prosperity is not the portion of any human institution." Again—and this was after the Directors had held several meetings to discuss various improvements needed at the works: "The Committee, acting in the same cautious spirit, have avoided laying-out any money in improving the works."

Mr. W. W. Townsend (Colchester) proposed "The Newark Gas Company—Our Hosts To-day." He remarked that the gas industry had to meet acute competition, even in connection with the tarring of roads, and it was necessary for them to consider how best to meet the competition of various road compounds. It was a great pleasure to come to Newark, and they all felt that it was well worth while, if only for the visit to the works. He believed it was the first time the Association had been to this interesting old town. It was rather in a corner of their district, but the members had assembled in big numbers to do honour to their President. They had been much struck by what they had seen at the works. In fact, he himself did not remember to have seen a better works of the size. Mr. West had had a great deal to do with carrying out the various alterations, which revealed much originality. The Town Council were acquiring a works which were well equipped in every way.

The Chairman suitably acknowledged the toast.

THE BUSINESS MEETING.

The business meeting was subsequently held in the hotel—the President in the chair.

Confirmation of Minutes.

The President said the first item on the agenda was the confirmation of the minutes. These had been published in the Technical Press, and in accordance with custom would be taken as read.

Their confirmation was agreed to.

Letters of Regret.

The Hon. Secretary (Mr. W. H. Mainwaring, of Lincoln) announced the receipt of several apologies for absence. Mr. J. Ferguson Bell had written regretting that he could not attend, as he was busily engaged in connection with the impending meeting of the Institution of Gas Engineers.

Government and the Electricity Supply Industry.

The Hon. Secretary said he had received from the Manchester District Institution of Gas Engineers a copy of the following resolution passed by them at their last meeting; and they asked the Eastern Counties Association to endorse it.

> "Having regard to the national importance of the gas industry, and particularly to the service it renders in conserving the coal supplies of the country, this meeting views with concern the reported proposals of the Government for financial assistance for the electricity supply industry, and urges the National Gas Council to take such steps as will ensure the full consideration by the Government of the claims of the gas industry, and suggests that all undertakings should be advised at some opportune time to appeal for the support of Members of Parliament representing the districts within their area of supply."

The President remarked that, as they were all aware, the National Gas Council had this matter in hand, and were doing excellent work; but he did not think it would do any harm if the Association passed this resolution.

Mr. R. G. Shadbolt (Birmingham) said he would like to propose the adoption of this resolution, as in this way they would be strengthening the hands of the National Gas Council, who were fully alive to the situation. Only that morning he had come across the following reference in a newspaper:

> "Speaking at Dovercourt, yesterday, Mr. Moore Brabazon (Parliamentary Secretary to the Transport Ministry) said he was the Minister charged with electricity. The Government were giving the question serious consideration, and, while not promising a land flowing with milk and honey, would do their best to make it a land flowing with volts and amperes."

The members might rely upon it that the National Gas Council were doing their best to put matters in the right light.

Mr. J. Wilkinson (Nottingham), in seconding, said he would like for a moment to refer to another aspect of the question which he did not think had been appreciated by the gas industry as a whole. This was that the electrical industry generally was able to purchase its fuel at a very much lower price, grade for grade of fuel, than the gas industry. He did not know why it was, and he must confess that he was astounded to find such a state of affairs existed. How was it that the electricity industry was able to purchase a 2 in. by 1 in. nut at from 4s. to 7s. per ton less than the figure at which the gas industry was able to procure a similar coal? The only explanation the colliery company could give was that the coal was from a different seam. But it was costing the colliery company just as much to produce. For the last two years, or even longer, the electrical industry had been able to purchase fuel, similar to that of the gas industry in grade, though possibly from another seam, at from 3s. to 5s. a ton less than the gas industry had paid.

The resolution was agreed to.

An Employment Register.

The Hon. Secretary next announced the receipt of the following letter from Mr. W. T. Dunn, the Secretary of the Institution of Gas Engineers.

> At the last meeting of the Council, it was unanimously resolved that there should be established in connection with the Institution a register for the assistance of those members of the Institution out of employment.
>
> I was directed to convey to you this information, with a view to your kindly informing all your members of the fact, so that the register may be of real use to those for whose benefit it is intended.
>
> The Council will greatly appreciate the assistance of your Association in this direction.

As Mr. Dunn was present, perhaps he would kindly explain the proposal to the meeting.

Mr. Walter Dunn said the Council of the Institution of Gas Engineers regarded this as a very important matter. They desired that the Institution should be of the greatest possible value to the members. This proposal, he thought, would meet with general approval. Of course, the scheme was intended for members of the Institution. Naturally, those who joined the Institution and supported it with their contributions were those who should benefit from any movement of this kind. The register was not intended for those who wished to improve their present position, but for those who were actually out of employment. The question was how best the Institution could help such members. They might do it in various ways—with the assistance of the members themselves. Many members would know of appointments becoming vacant, and might be kind enough to advise him of the fact. For a long time he had kept a register of those out of employment; and if they could be provided with appointments, the Institution would be doing a real service.

Mr. J. Wilkinson remarked that this was a serious attempt on the part of the Institution to help those who, through no fault of their own, found themselves out of employment.

Mr. P. D. Walmsley (Great Yarmouth) said he was in the fullest sympathy with all that had been said in this connection. Every assistance should be afforded to members who, from causes perhaps outside their own control, found themselves temporarily out of employment. It was very desirable that the Institution should recognize this as one of its duties to its members; but there was a very important reservation he would make. Without going into any further details, the members of the Institution must recognize that there were from time to time certain members who were, through their own fault, in the ranks of the unemployed. Not one of them had any desire to hit a man when he was down; but, without saying more, he submitted that it would be very dangerous to let the idea go forth that, because a member had his name put on such a list, this was tantamount to the Institution guaranteeing his integrity and suitability for a position for which he was an applicant. It was a delicate subject; but he trusted members

would appreciate his meaning, and accept his remarks in the spirit in which they were made.

Mr. DUNN replied that the Institution would not accept responsibility in regard to any member whose name might be put forward for an appointment. His *bona fides* would have to be inquired into by those contemplating employing him.

WEMBLEY.

Mr. W. M. MASON (Manager of the British Commercial Gas Association) addressed the meeting on the subject of the forthcoming Gas Exhibit at Wembley. The decision to take part in this year's Exhibition was, he said, come to after the fullest consideration by a thoroughly representative meeting; and the main thing which weighed with the members present at the meeting referred to, and which had continued to weigh with the leaders of the industry, who had practically unanimously agreed to go on with Wembley again this year, was the competition of electricity. There was electrical competition going on all over the place. If it was straight competition, however, it would be all right; but it was backed by the chief political parties. This meant that the gas industry was at stake, and that it absolutely must pull together and subscribe together. If the politicians and the electricians had their way, there would in time to come be no place at all for the gas industry. It was essential that they should present a united front. The Eastern Counties, as a district, were doing splendidly; but they could do still better if all, big and small, united to this end.

NEW MEMBERS.

On the proposition of Mr. R. J. CALDERWOOD (Spalding), seconded by Mr. R. WARDELL (Peterborough), the following were added to the roll:

Members.

Mr. A. O. Snell, Maldon.
Mr. R. Bowden, Lincoln.

Associate Member.

Mr. A. J. Underwood, Showroom Manager, Braintree.

ANNUAL REPORT AND ACCOUNTS.

The PRESIDENT remarked that the annual report and balance-sheet had been circulated among the members, and were submitted by the Committee for adoption, with a recommendation that five guineas be paid as a donation to the Benevolent Fund of the Institution of Gas Engineers.

The report and accounts were adopted, on the motion of Mr. J. H. DOUGALL (Boston), seconded by Mr. G. A. MALLETT (Ipswich).

PRESIDENTIAL ADDRESS.

Mr. WEST then delivered his Presidential Address, which will be found on pp. 237-240 of the "JOURNAL" for April 22.

Mr. W. W. TOWNSEND (Colchester) proposed that the best thanks of the Association be tendered to the President for his most interesting and illuminating address. He had taken a very wide sweep, and had given them food for thought in many directions. On the whole, there would be agreement with the arguments he had advanced. The address, and their visit to the works, revealed Mr. West as a thoroughly up-to-date gas engineer. The simple, quiet, and effective coke plant introduced by Mr. West at the gas-works must have struck many of them. He was also to be congratulated upon the even chart he had produced of the gas sent out. The admirable and well-equipped showroom in the Market Place showed, again, that the undertaking was alive to its responsibilities, and to the need for showing the public what could be done with the aid of gas.

Mr. SHADBOLT said he would like to second the vote, for the reason that he had personally known the Newark gas undertaking for the last thirty years, and had seen it progress from a very backward condition to the excellent position it occupied now. The circumstances when Mr. West took up his appointment at Newark were abnormal in many respects; and these abnormal conditions accounted for many of his difficulties. The President was one of those optimists who were so necessary to gas administration at the present time. Certainly there was every reason for them to be optimistic, when they took into account the vast possibilities of their industry. The President was well equipped in every way to deal with the problems that confronted him; and they would be doing less than their duty if they failed to record their hearty appreciation of his services both to the Association and to the industry.

The PRESIDENT expressed his gratification at the kind way in which they had received his address, and at the nice things that had been said about him. It was a difficult thing to write a presidential address; but he had felt for some time that they were as an industry very much inclined to leave things to the National Gas Council, the "B.C.G.A.," and the various other organizations. If each one would strive his utmost to help in the good work, not only by giving subscriptions, but by "doing his little bit" in his own way, it would be much to the good of the industry. As an industry they must stand together as firmly as possible. They had to fight, and fight hard; each one must do his share of the fighting.

GAS FOR INDUSTRY.

Mr. C. BRYAN DONKIN (an associate member of the Association) read a paper on "Gas for Industry." This will be found on p. 312.

NEW OFFICE-BEARERS.

The following office-bearers were next elected:

President.—Mr. Frank Prentice, Ipswich.

Vice-President.—Mr. J. B. Hansford, Bedford.

New Members of Committee.—Mr. H. C. Smith, Tottenham; and Mr. E. W. Smith, Chelmsford.

Auditors.—Mr. G. A. Mallett, Ipswich; and Mr. W. S. Venner, Brentwood.

Hon. Secretary and Treasurer.—Mr. W. H. Mainwaring, Lincoln.

Mr. J. W. AUCHTERLONIE (Cambridge), proposing Mr. Frank Prentice as President for the ensuing year, said they were all extremely pleased that this gentleman had at last consented to take office. In honouring him, the Association would be honouring themselves. Mr. Prentice had occupied a very prominent position as Chairman of their Regional Council, and in that work had given great satisfaction. That he would do equally well as their President, all were firmly convinced.

The motion was seconded by Mr. H. G. RUGGLES (Leighton Buzzard), and carried with acclamation.

The Hon. Secretary and the Auditors were heartily thanked for their services; the PRESIDENT remarking that the success of the Association depended more upon the Hon. Secretary than anyone else. Mr. Mainwaring devoted a tremendous amount of time to the work.

PLACE OF NEXT MEETING.

It was agreed to leave the Committee to determine the place of next meeting.

REPRESENTATIVE ON THE INSTITUTION COUNCIL.

On the proposition of Mr. S. HANDS (Sleaford), the President (Mr. West) was elected to represent the Association on the Council of the Institution of Gas Engineers.

This concluded the business, and the members and friends thereafter took tea together.

ANNUAL DINNER.

In the evening members and guests assembled in goodly numbers in the Clinton Arms Hotel, where the annual dinner took place. The President was in the chair, and was supported by Directors of the Gas Company, by the Vice-President (Mr. F. Prentice, of Ipswich), members of the Committee, and several Past-Presidents. The Mayor of Newark (Councillor W. K. Clarke) was there, with Alderman L. Priestley (the Chairman of the Corporation Gas and Electricity Committee), and other prominent townsmen; and so also were Alderman J. Clark, J.P. (of Chesterfield), Mr. W. T. Dunn, and Mr. W. M. Mason. A thoroughly enjoyable evening was spent in toasting, music, and song. The Loyal Toasts having been honoured at the call of the President,

Mr. J. C. KEW, M.B.E., J.P. (a Director of the Newark-on-Trent Gas Company), submitted "Success to the Eastern Counties Gas Managers' Association." He understood that the President earlier in the day had given them some very good advice on the value of advertising; and he wished to reinforce this advice, because he was sure they would benefit if, in the towns and cities from which they came, they used the local Press in order to advertise their commodity. In the fight which they were waging against electricity, they would have to take all possible steps to make known the virtues and the capabilities of the product which they were so excellently providing; and—speaking, as he did, as a newspaper proprietor—he had no hesitation in saying that they could not do better than utilize the columns of the local Press. His only fear was that when the Newark Gas Company were taken over by the Corporation, it might be thought that the time for advertising was past. He hoped that this would not be so, and that the new owners would take to heart the advice of the President in this respect. It was his pleasure to couple with the toast the name of the President; and if he were to say all he could say, all he ought to say, and all Mr. West deserved, he would keep them listening a long time. In their President they had a very able gas engineer—one whose qualities were many-sided, who had made his name in Newark, and who had rescued the gas-works from a very derelict condition and brought them into a state of considerable efficiency. As Directors, they had great confidence in Mr. West; and they felt that they had cause to be grateful to him for remaining in Newark. The reason must be that Mr. West, having started to "put their house in order," to reconstruct the works, and to bring the undertaking into a state of the highest efficiency and dividend-earning capacity, wished to see the work finished before he passed on. He hoped that under the new ownership Mr. West would find himself on "a bed of roses," and that Newark would succeed in retaining his services for many years to come.

The PRESIDENT, in response, said the Association, in common with the other District Associations, played a very important part in the organization of the gas industry, and were undoubtedly of help to the parent Institution as well as to the various engineers who were members and to the undertakings they represented. He well remembered many years ago the new manager of a very small works coming over to where he (the President) was engaged, to gather some information. It was a wet day, and he took off his coat and placed it on the governor, thereby affecting the pressure. He was told about it, and he said: "I have not got a governor. What I want to know is whether you push or whether you pull." If that gentleman had been a member of one of these Associations, he would probably have got more information in a very short time than he could easily have assimilated. The Association had been very successful in the

past, and he hoped that it had very many years of usefulness before it. Certainly, it was very gratifying to reflect that they had still three of the original members with them—Mr. H. Wimhurst, of Sleaford; Mr. J. Barton, of Peterborough; and Mr. E. J. Brockway, of Cleethorpes—and he hoped they might long be spared to remain members. This was the first occasion on which Newark had been honoured with a visit by the Association; but he hoped that the Corporation, as the new owners of the gas undertaking, would one day entertain them again, when the cycle of works in the area had been completed.

Mr. F. Prentice proposed "The Newark Gas Company," and coupled with the toast the name of Mr. W. A. Ferrier, one of the Directors. One of the most amazing things, he said, connected with the gas industry was the success which attended it—and this in spite of its "enemies," electrical or otherwise. Perhaps electricity had been rather a friend to them, because it had awakened them and increased their efficiency. As a matter of fact, electricity and gas should run hand in hand; for there were things that electricity could not do advantageously which gas could, and the exact opposite was also the truth. A vivid illustration of the extraordinary vitality of the industry, they had before them in the Newark Gas Company. Under the wise administration of the Board, and more particularly under the skilful management of their President, the undertaking had made remarkable progress. In one respect especially he wished to pay tribute to Mr. West. He had seen a good deal of him in London in connection with some of the national organizations, and his wise judgments and sane counsels were always highly appreciated. He ventured to think it would not be very long before the President made a mark in the industry of which they would all be very proud.

The Human Element.

In the case of gas companies it was of vital importance to deal fairly and justly with three sets of people. First came the consumer. It was of supreme importance that consumers should be satisfied and contented; and some of them, as they well knew, were not. Then one of the main qualifications in these days for a gas engineer was to know how to handle men. The working men of to-day were getting more and more difficult to handle; they needed almost a special study. It must be remembered that the men were being bombarded by fantastic nonsense, which was poured into their ears by agitators whose very existence depended upon the gap which existed between employers and employed. If he himself had the appointing of an engineer to a works of any importance, the question to which he would first endeavour to secure an answer would be, not how many examinations he had passed, not what letters he could put after his name, but if he knew how to handle men. ["Hear, hear."] This knowledge was an invaluable asset to a gas engineer, without which all the skill in the world was of little avail. Thirdly, there was the shareholder to consider. From the limited observations he had been able to make of the working of the Newark Gas Company, it seemed to him that they had succeeded in dealing fairly and justly with these three important sets of persons.

Mr. W. A. Ferrier, replying, said all who had seen the works would realize how greatly indebted to Mr. West the Company were; and, speaking for the Directors, he could say they did not feel at all ashamed of the state in which they would be handing over the works to the Corporation. Thanks to Mr. West, they were in the high state of efficiency which had been so flatteringly referred to during the day. The ability to understand human nature was one of the main things that led to the success of any business. The initiation in Newark of a system of inspection for each individual householder had been followed by a great increase of business; and the demonstration showroom had been a wonderful success. By paying attention to little things, much satisfaction was given to the consumers. The Company had been prompted to enter into negotiations with the Corporation for the sale of the undertaking by the feeling that public utility concerns should be in the hands of the local authority. There had been ambitious ideas regarding the introduction of electricity; and he hoped that when the present state of suspension passed away, the supply of electric current in bulk to the town would enable the Corporation to give a good service of both gas and electricity with the staff which was now in existence, thus enabling them to operate the two undertakings at a minimum cost, to the advantage of the town. This he would say to the Corporation: "Retain, if possible, the services of Mr. West." ["Hear, hear."]

Mr. Thomas Glover, C.B.E., M.Inst.C.E., proposing "The Town and Trade of Newark-on-Trent," said they were all conscious that they had met that day in a very interesting and ancient town; and at the same time they felt that they were in not only an historic town, but one which was modern in regard to its industries and its trade. For nearly 400 years Newark had had a charter of incorporation. They were honoured as an Association in having with them his Worship the Mayor, Alderman Priestley, and others.

The Mayor, in acknowledgment, said that though the town progressed slowly, still it was progressing, and he thought in the future it would be much more important and prosperous than in the past. He trusted that when the Corporation took over the gas undertaking they would give satisfaction to the consumers, and that the gas might be even cheaper than it was at the present time. The great thing to do was to cheapen as much as possible those commodities that people could not do without. It seemed to him that gas and electricity would run very well together in Newark. A good deal had been said about Mr. West that day. There was no one who more appreciated Mr. West's work and his great ability as a gas engineer than he (the Mayor) did; and he hoped the Corporation would retain his services.

Mr. E. F. Keable submitted "The President"—a charmingly unassuming man who was greatly admired by all of them. During their visit to the works they had seen much which reflected credit both on the Directors and on Mr. West.

The reply of the President brought to a close the first day's proceedings of a wholly successful meeting.

The Bryan Donkin Company.

Equally well arranged and attractive was the programme for the following day, when those members (with a few friends) who had been able to stay in Newark over-night proceeded by motor from Newark Market Place to the works of the Bryan Donkin Company, Ltd., at Chesterfield. With fine weather, the drive through the famous "Dukeries" country of Nottinghamshire, and the return by way of Mansfield, proved most enjoyable. A warm welcome awaited the travellers at Chesterfield, where they were met by their old friend, and genial host, Alderman George Clark, J.P., M.Inst.Mech.E. (Managing Director of the Bryan Donkin Company), and various members of the staff—including Mr. A. G. Webb (Secretary), Mr. Buxton (Works Manager), Mr. Seaman (Chief Draughtsman), Mr. Tucker (Assistant Works Manager), Mr. Cyril Donkin and Mr. Fennemore (District Engineers), Mr. Dickinson, and Mr. Hopkinson (British Furnaces Staff).

Under such able guidance a tour was made of the works, the great extent of which proved a revelation to those visitors who had not seen them previously. Alderman Clark himself was at the head of the parties, and from his wealth of knowledge of the business and the works was able to impart much information during the inspection. Alderman Clark went to Chesterfield from the London works of the Company at Bermondsey in 1900, as Works Manager; and under his control as Managing Director during the past nineteen years, the concern has developed steadily, until at the present time the employees number about 700. Alderman Clark is Chairman of the Gas Committee of the Chesterfield Corporation, and was Chairman of the Society of British Gas Industries in 1921-22. He is also a Vice-President of the British Commercial Gas Association, a member of the National Gas Council, and is on the Grand Council of the Federation of British Industries. He was Mayor of Chesterfield in 1922-23.

History.

The history of the firm goes back much more than a century; the business having been founded in 1803 at Bermondsey, by Mr. Bryan Donkin, F.R.S.; and much varied and valuable work was done right at the commencement, though it is unfortunately impossible to enter into this here. It was between the years 1840 and 1850 that the Company began to devote their attention to the gas industry. In 1847 a special type of valve known as the rack-and-pinion valve was designed at the suggestion of the Chartered Gas Company, of London; and it is still one of the chief products at the Chesterfield works, where over 1000 tons are turned out yearly. Other designs of valves followed for use in different parts of gas-works.

The firm also took up the manufacture of gas exhausters, which has since become such an important section of their business—making what was known as "the 1847 patent." This was afterwards superseded by the manufacture of John Beale's design, patented in 1866. A number of these were made, chiefly in large sizes, and many are running well to this day. They were, however, gradually superseded by a later patent of Beale's, dated 1877, which has many advantages over his earlier efforts, and has come into use more than any other type in Great Britain. A further patent on this design was taken out by Mr. Thomas Donkin's eldest son, Mr. E. Bryan Donkin, who evinced a special interest in this class of machine, and read an excellent paper on the subject at the Belfast meeting of the Incorporated Gas Institute in 1893. He also invented and patented several other improvements in the gas-works apparatus that the firm manufactured, and turned his attention chiefly to developing the business in that direction. He became a partner on the retirement of his father from the business, and was in active control of it for over twenty years.

After a century of eventful history in Bermondsey, the growing interests of the business and the difficulties of transit and expansion on an adequate scale in Bermondsey caused the firm to seek greater conveniences, and the whole concern was removed to Chesterfield. An amalgamation was effected with the firm of Clench & Co., and their well-equipped and modern works taken over and adapted to the combined requirements. The site comprises 14 acres. It is connected by sidings with the London, Midland, & Scottish and the London & North-Eastern Railway Companies, and is in the centre of the great coal and iron district of Derbyshire. Extensions have been continuous, and during the period 1902-25 practically all the departments have been considerably enlarged, until at present the area occupied by the buildings alone is over 4 acres, and the works are equipped with every class of modern machinery. In 1912 the present fine offices were built, the old offices being converted into the general stores. In 1917 a new erecting and testing shop of 7900 sq.ft. area was built, and later a women's canteen of 1440 sq.ft. area. A new fettling shop and sand blast house, a core shop, and works' repair shop have recently been built; and a large ferro-concrete pattern stores in two floors, with a total area of 16,000 sq.ft., is nearing completion. An extension of the valve shop of three bays, each 25 ft. wide by 96 ft. long, has just been started, and further extensions are in contemplation to meet the increasing demand for the Company's specialities.

A "History of Bryan Donkin & Co. (1803-1925)," which is of engrossing interest, has been compiled by Mr. Harry J. Donkin.

Gas Apparatus Manufacture.

The Company have continued at Chesterfield to manufacture their well-known specialities—the positive gas exhauster (which is now made with two, three, or four blades, according to the

EASTERN COUNTIES ASSOCIATION, HALF-YEARLY MEETING.

preference of the gas engineer), gas valves, motor parts, tar and liquor pumps, &c. During this period the usual initiative of the firm in adapting themselves to the changing times has been shown in many ways—notably in the acquirement, from Prof. Rateau, of Paris, of rights in the turbo-exhauster. No less than 183 of these machines are already at work (or on order) in gas works and collieries, and for coke oven installations, doing duty as exhausters, boosters, blowers, &c., representing a capacity of 85,094,166 c.ft. per hour. They can be driven by steam turbine, electric motor, or belt. In addition to high-pressure gas transmission plant, the Company make, under license from the Reynolds Company and the Mueller Company, reducing governors and fittings for district and service purposes. To take the place of the German coke-oven valve, the Company are manufacturing a light pattern valve with internal or external screw, many thousands of which have been sold. A gland plug cock also has been designed, and has met with a large and increasing demand; and the Company are now making a special tar cock for use on tar towers and tanks. In 1921 the firm became interested in British Furnaces, Ltd., who handle every type of heating or fuel treatment equipment as well as small water gas plants and gas-fired boilers. As a matter of fact, some of the furnaces to which Mr. C. Bryan Donkin had referred in his paper on the previous day were seen in operation.

In the huge machine shop, and other parts, a great deal of work of a varied kind for different gas and similar undertakings was noted in progress. To mention some, there was apparatus for the Gas Light and Coke Company, the Birmingham Corporation, the Coppée Company, the Glasgow Corporation, the South Metropolitan Gas Company, the Synthetic Ammonia Company (Billingham), the Aldershot Gas, Water, and District Lighting Company, the Wigan Corporation, the Oxford Gas Company, the Preston Gas Company, the Ripon Corporation, the Liverpool Gas Company, and the Yeovil Corporation, as well as Cambuslang, New Hunstanton, Kenilworth, and Bellshill, and also a number of governors for Copenhagen.

As to the gas type-metal melting installations of British Furnaces, Ltd., it can only be said that the extent to which these have been, and are being, adopted in newspaper and other printing works is remarkable. The particulars of these installations reveal extensive recognition on the part of printers of the advantages of gas in this connection, and a big field of business for the gas industry.

Of all the interesting processes inspected in the works, space will not permit details to be given here. Mould ramming is performed by compressed air machinery of an ingenious character. Bumping machines, sunk in the ground, and also operated by compressed air, attacking the mould from beneath, save a lot of laborious work. Indeed, a principle of the works is labour saving in every possible direction. The core shop has been "manned" entirely by girls for the past twenty and more years. The firm were among the first in England to employ girls for this purpose in an engineering works. It is pleasant work which is excellently suited to female labour. Much attention was devoted to the already mentioned ferro-concrete pattern stores now in course of construction. These were designed, and are being built, by the Company's staff. There is still space on the site for extensions, for which the various buildings have been designed.

Hospitality.

At the conclusion of the inspection, the visitors were the guests of the Company at luncheon in the Station Hotel—with Alderman Clark in the chair. There were also present the Mayor of Chesterfield (Mr. W. E. Wakerley, J.P.), Sir Ernest Shentall, J.P. (a member of the Town Council), Alderman H. Edmunds, J.P., and Mr. Harold Davies (the Gas Engineer). The toast list was of the shortest—"The King," "The Eastern Counties Gas Managers' Association," and "The Mayor and Corporation of Chesterfield."

Submitting the second, Alderman Clark welcomed the Association to Chesterfield, and made reference to his firm's associa- with no less a person than Murdoch himself. To every gas engineer the name of Murdoch was like a talisman; for he was the father and founder of an industry which, though it had small beginnings, had since grown to such enormous dimensions. Bryan Donkin, the founder of the firm, was born in 1768, at a wonderful period in English history, and was associated with all those giants of science who, without the aid of textbooks, and really of their own knowledge, built the industrial England which existed to-day. In addition to knowing Murdoch, he was connected in business with Telford, Rennie, Bramah, Boulton and Watt, Simpson, Maudslay, Congreve, the two Brunels, and Nasmyth. An entry in Bryan Donkin's diary (under date of January, 1814) had reference to a visit to Boulton and Watt's works at Soho, Birmingham, and was in the following terms:

> "Mr. Murdoch showed me the foundry, which is large enough to melt 30 cwt. of iron at one time. Young Mr. Watt asked me to call on his father (James Watt). Mr. Murdoch accompanied me, and I was kindly received by the old gentleman, who is now 84."

His (the speaker's) firm were proud of their history; not only were they linked with the past, but they were alive to the needs of the present.

The President's reply afforded him an opportunity of gracefully thanking Alderman Clark and the Bryan Donkin Company for all the kindness that the Association had received at their hands.

"The Mayor and Corporation of Chesterfield" was proposed by Mr. F. Prentice and replied to by the Mayor, who stated that the Chesterfield gas and water undertaking was in private hands up to 1895, but was acquired by the town in that year. The purchase money was just under £250,000, and was found by the issue of 2¾ p.ct. stock at a premium of 30s.

Chrisman Down-Run Process.

The down-run process developed under the direction of Mr. C. S. Chrisman, of the U.G.I. Contracting Company, and applied to a carburetted water gas set, has been described, in a paper presented to the Pennsylvania Gas Association, by Mr. L. W. Seltzer, the Engineer to the Reading (Pa.) Consumers' Gas Company. The process is one by which all the gas made on the down run is taken from the bottom of the generator, and led to some point beyond the superheater but ahead of the wash box, thus making the down-run gases by-pass the carburettor and superheater. The idea is based on the fact that the gases made on the down run leave the generator at a very much lower temperature than either the blast or the up-run gases, and that this temperature is far below that required in the carburettor and superheater for efficient oil results. These comparatively cool gases by-passing the carburettor and superheater prevent the unnecessary abstraction of heat from the plant, and the correct temperature for efficient oil fixing can be maintained with a decreased fuel consumption. For the purpose of properly carburetting the gas, it becomes necessary, with this process, to use oil during the up run only. The Gas Company at Reading have used this method of gas making, with a decrease of from 2 to 3 lbs. per 1000 c.ft. in generator fuel, and a considerable increase in the capacity of the set.

GAS FOR INDUSTRY.

By C. Bryan Donkin.

[A Paper before the Eastern Counties Gas Managers' Association, April 22.]

The use of town gas for industrial heating purposes is a subject of interest to every gas manager, as it is adapted to every purpose where heat is required. Even the smallest town nowadays boasts at least one garage where gas can be used for brazing, hardening tools, and other purposes; while its uses in the larger towns and cities are innumerable. I believe that the British Commercial Gas Association have a list of about 3000 distinct trades in which gas is employed. I propose dealing with this subject as far as possible from the gas managers' point of view, bringing forward those arguments for its use in preference to other fuels, which should appeal to the prospective consumer.

The movement now in existence for promoting means of eliminating the contamination of the atmosphere by smoke is a great point in favour of the use of gas, especially in our cities where fog is prevalent; but an even greater advantage is the improved conditions of the workers in those factories employing gas fuel, resulting in better work and greater output. In order to appreciate this, it is only necessary to visit, for instance, a foundry or printing works using gas, and to note the clean surroundings, free from smoke and dust, and the normal temperature of the shops.

The economy of gas does not lie in fuel cost alone. Gas is delivered to the point where it is to be consumed; coal or coke has to be carted, and the ashes have to be removed. No space is required for storage—an important matter in many works where ground space is limited. Labour costs are saved, as no stoking is required. There is no waste of fuel, for gas can be shut off as soon as it is not required. Temperature can be controlled exactly, and heat applied where it is wanted. Labour is saved in cleaning the workshops, as there is no smoke or dust. All these facts should be taken into account when comparing fuel costs. In addition, it is often possible to increase output of a furnace by converting it to gas; fewer furnaces then being required for a given output.

During the war, when furnaces were required quickly and in large numbers, there was no time to go into questions of design and efficiency. Consequently consumers got the impression that gas was an expensive and inefficient fuel. However, very great advances have been made in the scientific design of the gas furnace; and gas can now show efficiencies far greater than other fuels. In order to employ it economically for heating purposes, there are three important points to bear in mind. The first is that the gas and air must be thoroughly and intimately mixed in the correct proportions, and this mixture must be kept constant under all conditions. The second is that this gas-air mixture should be completely burned under conditions producing the greatest amount of heat, and this heat applied in the most efficient manner. The third is that the furnace itself should be properly insulated, for every unit of heat radiating to the surrounding air is so much loss.

Taking the above points in order, it is necessary that either the gas or the air should be under pressure. If high-pressure gas is used, it may be compressed up to 5 to 10 lbs.; if the air is compressed, about 1 lb. is sufficient. There are various methods of mixing the gas and air; one of the simplest being by means of an inspirator (fig. 1). This is essentially a throat

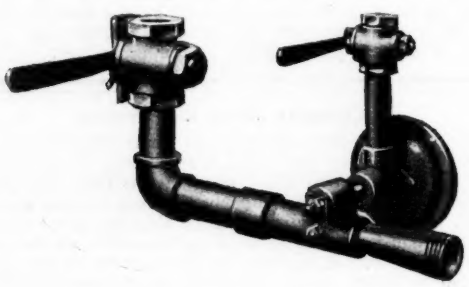


Fig. 1.

of venturi form through which the air from the blower passes, inspirating the gas, which is kept at a constant pressure by a governor. With these inspirators the gas and air are thoroughly mixed, and the proportions are kept constant within 1 p.ct. over large ranges of volume. Thus only one valve is required to regulate the temperature, and the most economical combustion of the gas is ensured. For gas under pressure, a somewhat similar inspirator is used (fig. 2). In this case the governor is not required, as the gas inspirates the air.

Having got the proper air-gas mixture, the next question is how to burn it efficiently and completely so as to produce the

Fig. 2.

maximum amount of heat. Of many methods, one of the most interesting is the so-called surface-combustion system. Fig. 3 shows a furnace in which there are two burners set at an angle, and from them issues the air-gas mixture at such a speed that it cannot light back. This mixture is forced into beds of broken refractory material, where it loses its velocity and burns on the surface, raising the beds to a high temperature without any visible flame, the heat being reflected on to the work from the furnace walls and arch. A perfectly even temperature is obtained over the whole of the interior of the furnace, and it is possible to carry-out the most delicate work without the use of a muffle.

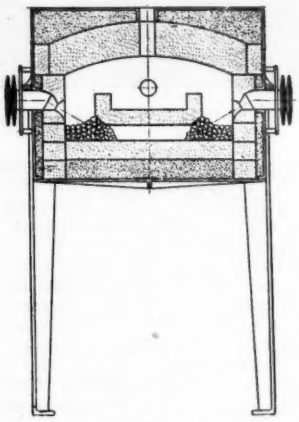


Fig. 3.

The question of insulation has not had the attention it deserves—partly, perhaps, on account of cost; but it is true economy in the end. The refractory lining of the furnace is not usually a good insulator, and it is necessary to back it up with some material having low heat-conducting capacity. Increasing the thickness of the firebrick walls is not of much use; and it is the special insulation that increases the first cost. The applications of heat in industry are so numerous that I can only describe a few of the most common.

The type of furnace just described may be used for tool hardening, annealing, billet heating, refractory testing, pottery baking, &c.

Galvanizing is an important industry, and gas is especially suitable for heating the baths. Fig. 4 shows how the bed of refractory material is arranged along the sides of the bath; the

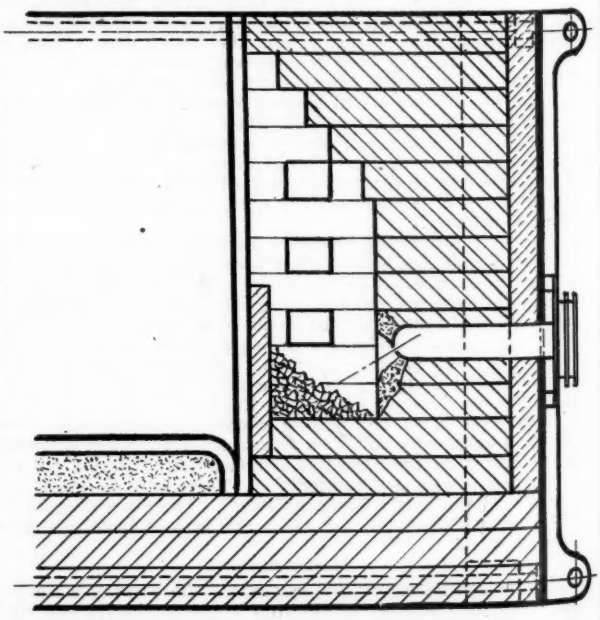


Fig. 4.

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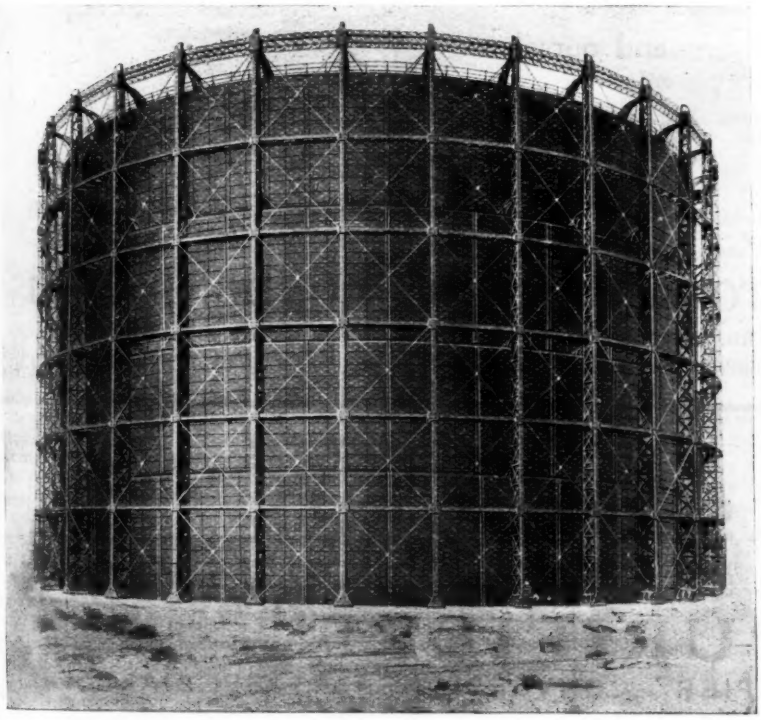

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lower part being protected by an insulating wall, so that it is not heated below the normal dross level. This results in perfectly even heating with no "hot spots," a great reduction in the amount of dross, and increased life of the bath. It is difficult to give gas consumptions, as conditions vary so much; but the following figures taken from a bath in actual use may be of interest:

Size of bath, 6 ft. 6 in. by 5 ft. 6 in. by 3 ft. 6 in.
Throughput, 30 cwt. of sheets per hour.
Gas consumption, 3200 c.ft. of 425 B.Th.U. gas per hour.

To keep the bath molten during stand-by periods, 500 c.ft. of gas per hour is required. When a galvanizing bath is converted from coke firing to gas, it is usually possible greatly to

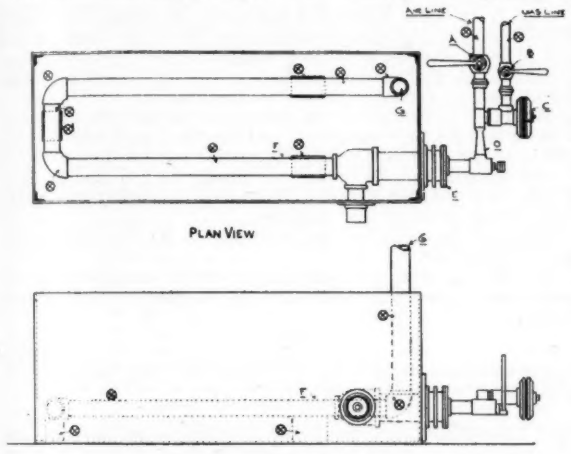


Fig. 5.

increase the output; or, conversely, if a gas-fired bath is installed, a very much smaller one will do the work.

The use of gas in newspaper printing works is rapidly increasing, as the proprietors are beginning to realize its advantages; there being no smoke or dust to interfere with the delicate printing machinery. The type-metal pot is heated by burners supplied by the gas-proportioning system; and the output from this type of furnace is very much greater than if solid fuel were used. During stand-by periods the metal is kept molten by an atmospheric burner; the pot thus being always ready for work. For type-metal melting it is always advisable to have a pot suitable for the normal output, as the gas consumption does not increase so rapidly as the output of metal. Therefore a large pot working at a small output is relatively inefficient. Given a furnace of this type working somewhere round its normal output, it is possible to melt over 8 lbs. of metal per c.ft. of gas. This system is, of course, particularly suitable for autoplate machines. Gas is also especially suitable for aluminium casting, on account of the freedom from oxidation; and it is now used exclusively by some of the largest aluminium foundries in this country.

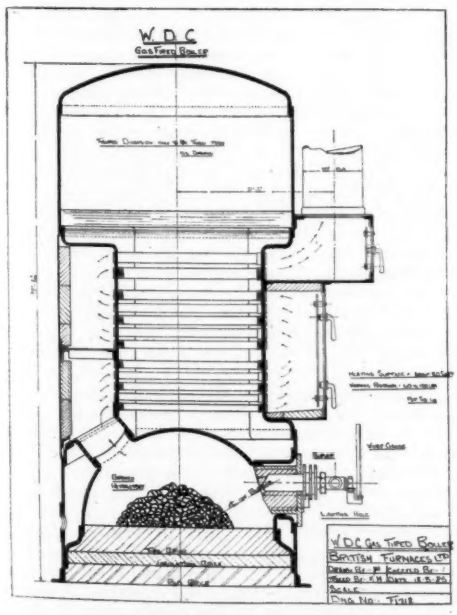


Fig. 6.

In many industries tanks of liquid are required to be kept heated; and the immersion burner (fig. 5) is particularly suitable. The illustration is of a 300-gallon tank, 78 in. by 30 in. by 30 in., with a 4-in. coil.

The burner is arranged in a pipe which enters the tank through one end and is carried round three sides and vertically up. The gas-air mixture being burned inside this pipe, the contents of the tanks are heated without loss by radiation, except from the liquid itself. There is no exposed flame, and the system is very suitable for chemical works, breweries, &c., and with special chemical mixtures for cleaning motor parts in car factories, or cooker parts in gas-works. This should be of special interest to gas managers.

Some processes require small quantities of steam; and the gas-fired boiler supplies a distinct need, as no stoking is required and there is no coal or ash to be carted. For many manufacturing processes it will be found that gas, bearing in mind the collateral advantages, can compete economically with other fuel for steam raising. These boilers can safely be controlled automatically; the steam pressure regulating the burner, and the water level the feed pump. No attendance therefore is required.

Fig. 6 is a section of this boiler showing the refractory bed; the burner being fitted to the fire-hole door. Tests show that an evaporation of 30 lbs. and over is obtained per sq. ft. of heating surface in the combustion chamber.

The following is the result of two tests carried out on two different boilers:

Number of test	1	2
Date	July 21, 1924	Oct. 25, 1924
Heating surface, about	150 sq. ft.	50 sq.ft.
Gas at 60° Fahr. and 30 in. used per hour	3378 32 c.ft.	1078·62 c.ft.
Calorific value of gas (net)	419 B.Th.U.	446·5 B.Th.U.
Amount of water evaporated per hour	1062 lbs.	366 lbs.
Temperature of feed	60° Fahr.	55° Fahr.
Steam pressure per sq. in.	103 lbs.	69·33 lbs.
Barometric pressure, per sq. in.	14·56 lbs.	14·85 lbs.
Heat utilized per hour	1,232,345 B.Th.U.	425,450 B.Th.U.
Heat available per hour	1,415,516 B.Th.U.	481,604 B.Th.U.
Net efficiency of boiler	87·07 p.ct.	88·34 p.ct.
Temperature of products leaving boiler	403° Fahr.	398·3° Fahr.
CO_2 content of products	11·3 p.ct.	—
Amount of water evaporated from and at 212° Fahr. per sq. ft. of heating surface	8·46 lbs.	8·75 lbs.

Rivet heating is another application for gas, and has the great advantage that the rivets can be uniformly heated without the formation of scale, for, with the proportioning inspirators described, the atmosphere of the furnaces can be set exactly. This question of scale is very important, for, if there is no scale on the rivets, caulking is avoided, thus saving time and labour. The rivet heater is fitted with two burners at the top which are supplied with the correct gas-air mixture by an inspirator. The rivets are fed into a hopper at the back which also acts as a pre-heating chamber, thus utilizing the waste heat. In those works where there is a high-pressure gas pipeline, the heater can be used as a portable unit with a flexible gas pipe connection.

For the process of steel hardening there are two methods, heating in an open furnace and quenching in water or oil, and the pot hardening system. The furnace shown in fig. 3 is very suitable for the first mentioned, as the atmosphere can be set so that no scale is formed. In the United States the pot hardening system has now come into general use; and it is beginning to attract attention in this country. The furnace in this case is circular; the burners being set tangentially at the top, so that the hot gas swirls round the outside of the pot, heating it evenly. As with this system there is no flame contact, the pots have a long life. Barium chloride and other special hardening mediums are used; and it is claimed that the results are more even and uniform than those obtained in an open furnace or muffle.

Further examples of gas heating for industry are: Forge furnaces, rod heating, shipyard furnaces, plate heating, case hardening, annealing, tinning, cone fusion for testing, and brazing torches, &c.

This question of industrial gas heating is one which deserves the closest possible attention by gas managers. Every opportunity should be taken of replacing other fuels by gas, as it means not only increasing the output of gas with the consequent possible reduction in price, but greater satisfaction to the consumer, better conditions for the work-people, less smoke, and general improvement in the health and surroundings of the whole community.

I will next show a few pictures of various types of furnaces. We then come to the question of efficiencies of different types, and a slide shows graphically the thermal efficiency. The lowest is the ordinary type; second, good ordinary—*i.e.*, well designed with good insulation; third, surface combustion. Be-

tween these should be a line for the converted furnace; for a good ordinary furnace with the usual two-valve control can be fitted with the surface combustion system with great advantage, and will give far better results than the usual type, though not quite so good as one specially designed for the system.

As an example from actual tests, a "Hoe" 6000 lb. type metal pot was converted. On the old system the gas consumption was 7000 to 8000 c.ft. per 24 hours; after conversion this was reduced to 4920 c.ft. per 24 hours—a saving of 33 p.ct. (1500 lbs. per hour). An "Autoplate Junior" was also converted, with the result that 8¼ tons of type metal were melted in 4½ hours by 4398 c.ft. of gas, against 7 tons in 5 hours with 4985 c.ft.—*i.e.*, 1 ton in 30 min. with 532 c.ft., against 1 ton in 43 min. by 712 c.ft. with the old system. This was a saving of 13 min. in time and 25 p.ct. in gas consumption.

A small rod-end furnace, fitted with this system in place of the standard two-valve control, was heated from cold to 1000° C. in 8 min. with 87 c.ft. of gas, as against 10 min. with 100 c.ft.—a saving of 2 min. and 13 p.ct. gas consumption. To hold the furnace at 1000° C. on the old system took 284 c.ft. per hour, and on the new system 198 c.ft. per hour—a saving of 30 p.ct.

[The report of the discussion to which the paper gave rise is held over until next week.]

Gas in the Brush Industry.

The brush industry of the United States has, we learn from the "American Gas Journal," enlisted the aid of gas as a fuel, which is playing an increasingly important part in the brush factories of the country. It appears that horsehair, for bristles, reaches the factories in large canvas bags. This must be carefully sterilized, and to that end huge vats of disinfectant are heated almost to the boiling point; and in these the hair—sacks and all—is immersed. Gas burners keep the liquid at a constant temperature, whereas with the coal formerly used many sacks of hair were destroyed by the unexpected boiling of the disinfectant. When the bristles have been cleaned and sorted, they are dipped in pitch to hold them in the wooden brush-backs. Until recently, the pitch was heated with charcoal, and frequently fires of the inflammable material resulted. Gas burners have entirely done away with this risk. The final stage in the manufacture of many brushes is japanning; and in this work gas has brought about notable improvements. The painted brush-backs were formerly baked in a coal-heated oven, with the result that dust was deposited on many of the wet brush-backs, ruining the high finish. The problem of dust has been eliminated by the use of gas; while the time required to dry brushes has been reduced from twelve hours to an hour-and-a-half in a gas-fired cabinet.

Heating by Gas in Los Angeles.

The gas heating of "height-limit" office buildings in the City of Los Angeles is the culmination of fifteen years of constant effort by the Los Angeles Gas and Electric Corporation. This statement is made by the Corporation's Industrial Engineer (Mr. C. M. Robert) in an article published by the "Gas Age-Record," in which he claims that high office buildings are adapted to the use of gaseous fuel for central heating. Fifteen years ago there were probably not more than a dozen gas furnaces on the Corporation's entire system, and these were house-heating installations. This mere handful was, however, the forerunner of a campaign which has resulted in a city that to-day uses gas to the practical exclusion of all other fuels for the heating of its homes. At the beginning of 1910, there were 66,175 meters on the system; and the average consumption of gas per meter for the preceding year was 22,505,438 B.Th.U. On Jan. 1 of this year the total number of meters had risen to 306,318, with an average annual consumption per meter for the preceding year of 44,135,047 B.Th.U. The rapid increase in population furnished a very fertile field for gas house-heating activity. The burner now used is of the Corporation's own invention. It is installed on the outside of the fire-door, and the gas is drawn through a cylinder with the stack velocity; the air for combustion being regulated by a slide.

An American Refractories Institute.—The announcement is made by "Industrial and Engineering Chemistry" of plans for the formation of a bureau to be called the American Refractories Institute, for the purpose of providing a satisfactory means of contact between representatives of all industries using or manufacturing refractories and for the study of the various economic and technical problems arising with respect to heat-resisting materials. A research laboratory will be operated in connection with this Institute. The Organizing Committee are inviting the special attention of users of refractories to the Institute, in accordance with the fundamental idea of making it a service bureau for the consumer as well as for the producer of refractories. Mr. Macdonald C. Booze, Senior Incumbent of the Multiple Industrial Fellowship on Refractories at the Mellon Institute, Pittsburg, has been appointed Secretary of the Organizing Committee.

MIDLAND JUNIOR GAS ASSOCIATION.

The Annual Meeting of the Association was held on Thursday, April 23, at the Birmingham Council House—Mr. Harry Clark, the retiring President, in the chair.

The annual report was approved on the motion of Mr. J. H. Gee, who took the opportunity of pointing to the responsibility of individual members.

The resolution was seconded by Mr. W. E. Cadwallader (Birmingham).

Mr. A. R. Myhill (Hon. Treasurer) presented the statement of accounts.

Mr. J. H. Gee (Central Laboratory, Nechells), the Senior Vice-President, becomes President, and Mr. C. F. Tooby, Foleshill Works, the Senior Vice-President.

Messrs. C. F. Deekin (Cradley) and G. E. Currier (Smethwick) were appointed members of the Council.

Mr. H. R. Hems was unanimously re-elected Hon. Secretary; and on behalf of the members the President paid tribute to the efficient way in which Mr. Hems carried out his duties.

Mr. Myhill stated that he was unable to continue as Hon. Treasurer; and Mr. George W. Smith (Nechells) was unanimously appointed to that position.

The meeting confirmed the re-election of Mr. W. P. Timbrell as Hon. Auditor.

Mr. T. H. Poulson (Stafford) warmly congratulated the Association upon their virility and the excellent work they were doing.

A discussion was opened by the President, on the subject of

UNACCOUNTED-FOR GAS.

It is surprising how much this very important question, gas unaccounted-for, is continually kept in the background by the gas industry. The magnitude of the difference between the amount of gas made and gas sold each year is fully realized when we know that the average quantity of gas unaccounted-for each year for 100 undertakings is 7 p.ct. If we take 30 of the largest undertakings that make over a thousand million cubic feet of gas per annum, we find the following startling figures: A total of 9,425,123,279 c.ft., or 47,125,616 therms. I wish to make it clear that these figures do not represent a distinct loss, for the simple reason that the difference in the conditions of measurement between gas made and gas sold, and the inevitable leakage from holders, mains, and services (the latter two are now materially affected by the tremendous increase in road transport), must be taken into consideration; and allowances should be made. Whether the subject is too large for the Junior Associations to tackle it is difficult to say, but we have the opportunity to-day of examining this tremendous difference apparent year after year. There are eight ways whereby we can account for the difference between gas made and gas sold; but I propose to deal with only one, which, during my experience in four large centres, I have found to be one of the worst—that is, meters. I will give some practical reasons why meters are guilty. Careful tests have revealed the fact that a very large number of meters register from 3 to 15 p.ct. slow; and in the case of prepayment meters it is a common occurrence for consumers to refrain from inserting another coin because they can obtain sufficient light for a period before the valve shuts-off the gas properly. This has been most marked since we have had war and post-war gas. A fair basis shows that out of 1000 meters, 250 register, on an average, 15 p.ct. slow—an alarming figure, but true. I will now deal briefly with the question of the cost of inspection, changing, and repairing prepayment meters, the gas through which forms the backbone of our consumption. Experience has proved that the most effective and economical way of tackling these meters is for the defect to be found by test meter inspectors on the district—not by ordinary meter inspectors. The former examine thoroughly 25 to 30 meters per day; and we are sure that only faulty meters will be changed and repaired. The total present-day cost is £1 5s. 6d. per 3 or 5 light meter. Many will disagree with this expenditure; but to those I say: We have no guarantee that the meters will remain at 15 p.ct. slow, and the chances are that the loss will soon increase; whereas, when the meter is changed, you have the guarantee and satisfaction that all is well for some time to come. In the remarkable paper given by Mr. A. T. Gilbert, in November, 1922, on "Gas Meters, Their Construction and Application" (see "Journal" for Dec. 6, 1922, p. 622), the author states that there were 78 meters exchanged, and the total gain in gas was 844,000 c.ft.—an average gain per meter of 10,800 c.ft. Assuming that the cost of finding each meter was 2000 c.ft., then the net gain per meter was 8800 c.ft. Far too much importance has been attached to the checking of the consumption figures by the rental department, who could be easily misled by the "fairy tale;" besides, inquiries are a delicate matter. It is much better to send and test on the consumers' premises. For many years I have studied closely the question of unaccounted-for gas and its relationship to the registration of all kinds of gas meters. I do not hesitate to recommend strongly the changing of all dry gas meters once in five to eight years, re-

membering that same are subject to much higher pressures and consumptions than was experienced years ago.

Mr. R. G. Marsh (Birmingham Gas Department), who was unable to be present, wrote as follows: One aspect of the manner in which we arrive at the figure of unaccounted-for gas has always struck me as being rather irrational. I refer to the fact that corrections for temperature and pressure are applied to the registration of the station meters at the works, while no correction whatever is applied to the registration of the meters which re-register it on the district, where the variations in temperature and pressure are at least likely to be just as important in their effects on the actual volume of the gas. As a matter of interest, I have made a few observations during the past week of the temperature of gas as actually delivered to consumers' meters on the district; and the average I have obtained is 46° Fahr. The gas is corrected to 60° Fahr. when passing through the station meters. Allowing a variation in volume of 1 p.ct. for each 4° Fahr. difference in temperature, this means that there is 3½ p.ct. shrinkage in the volume of the gas after it has passed the station meters and before it reaches the consumers' meters. There is, of course, a correction to be applied which acts in the opposite direction in respect of barometic changes. Taking the average figure to be 29½ in. in Birmingham, this represents a difference of about 1½ p.ct. increase in volume, due to lessened atmospheric pressure. The net result is that there is an amount of approximately 2 p.ct. which appears in our unaccounted-for figure, and which really is accounted for by the causes I have mentioned. Apparently, therefore, instead of our figure being about 5 p.ct., it should really be about 3 p.ct. I have not taken gas temperatures during the midsummer quarters; but I should be surprised if any very great difference in temperature would be found from the figures I have before mentioned. Some years ago we made a similar investigation, and the temperatures we obtained then very closely agreed with the figure of 46° Fahr. that I have mentioned. An amount of 2 p.ct. on the total quantity of gas sent out by an undertaking such as ours represents a loss in revenue of a very serious nature; and possibly it may be found worth while, at some later date, for gas undertakings to fit consumers' meters with some type of automatic gear to correct the registration to normal temperature and pressure. There has already been some work done on this question; and I think it is a practical proposition. The objection to it is, of course, that such an appliance would add to the expense and complication of meter mechanism, and it is desirable to keep such apparatus as simple and reliable as possible. On the facts ascertained, however, it would seem that there is an important percentage which is recoverable, and which at present appears against the undertaking, and is put down as unaccounted-for.

Mr. J. Hewett (Birmingham) observed that apart from the question of the registration of the meters in relation to temperature and pressure, there were other factors to be taken into account. There were leakages from the gasholders and other apparatus, as well as in the mains and services; and in Birmingham the unaccounted-for gas worked out at about 80,000 c.ft. an hour. An attempt was made to arrive at the amount of loss in the mains prior to 1914. The work of inquiry took two years, and, in all, they dealt with fifty miles of mains. The Department then had 900 miles of mains. They selected the routes along which were the oldest mains, and closely-spaced indicators were used. The losses at individual leakages were not severe, though in the aggregate the amount lost was large. Another cause accounting for some loss was the blowing and tilting of the holders; while a good deal of gas was lost in the making of connections. In his opinion, however, it was cheaper for the Department to lose the volume that now escaped into the atmosphere than to use a special apparatus by which the gas could be locked in. As to the estimates of non-metered supplies, for public lighting, &c., he could not say whether or not they were near the mark. In his own opinion more gas was used through the lamps than was credited in the books. Another factor was the use of by-passes.

Mr. S. W. Simmons (Dudley) attached great importance to the correcting of temperature and pressure. He complained that the meter readers were too favourably disposed to the consumer. At Dudley they had substantially reduced the leakage. He was satisfied there was a tremendous amount of unaccounted-for gas in public lighting. A close supervision of the by-passes was essential.

Mr. W. L. S. Spinks (Birmingham) mentioned the reference by the President to unaccounted-for gas due to meters registering slow. He thought it was possible to exaggerate this. If a dry meter was defective in registration, and 15 p.ct. slow, the chances were that some of this might be due to a leaky diaphragm. There were many meters which would register correctly at the normal rate at which they were tested; but if gas was passed at the rate of 120 c.ft. an hour, the registration might be 8 p.ct. fast, due to the way in which the valves were set. Temperature differences were responsible for much loss.

Mr. T. H. Poulson (Stafford) thought all gas unaccounted-for rose during the war period. It was so at Stafford; but they were now getting back gradually to pre-war figures. It was a paying proposition to deal promptly with small leakages. As to the reading of meters, they adopted in Stafford a system by which a responsible man went through the meters twice a quarter; he examined the meter book, made current entries, and then compared them with the previous records. If there was any serious deficit, he looked for an explanation. By this means considerable reductions had been made in regard to leakage.

Mr. J. H. Gee (Nechells) accepted Mr. Marsh's figures as to temperature, and pointed out that in an excellent statistical summary on the subject, Dr. Davidson gave the atmospheric temperature as 48° Fahr. for the whole year. [See the "Journal" Diary and Gas Calendar for 1925, p. 150.] This gave an apparent loss of 3 p.ct. on a moist gas.

Mr. Hewett pointed out that the services were so close together that, in making connections, &c., it was practically impossible to interrupt supplies. The unaccounted-for gas in Birmingham averaged 4·6 p.ct. over 25 years; and the loss was, of course, greater in the winter, when the actual consumption was 70 to 80 p.ct. more than in the summer.

SCOTTISH JUNIOR GAS ASSOCIATION.

(WESTERN DISTRICT.)

The Annual General Meeting was held in the Ca'doro Restaurant, Glasgow, on Saturday, April 18—Mr. M'Isaac, President, in the Chair.

The Hon. Secretary submitted the Council's annual report, which recorded that there was an increase of 30 members during the session; the total membership now being 355.

The Council's recommendation was unanimously adopted to send a donation of five guineas to the Gas Exhibit at the British Empire Exhibition, 1925, and five guineas to the Education Scheme of the Institution of Gas Engineers.

For the best paper read during last session, the adjudicators awarded the first prize to Mr. D. M'Kerracher, B.Sc., for his paper on "Heat Transmission," and second prize to Mr. R. Sturroch, Ardrossan, for his paper "A Chemist on Works Practice."

After the donations had been accounted for, the session closed with approximately £50 in hand. The Council's report was unanimously adopted.

Mr. R. Gray, Assistant Manager, Hamilton, automatically becomes President for next session. Mr. James Hall, of Glasgow, was unanimously elected Vice-President. Mr. J. Murray was re-elected for the post of Secretary and Treasurer. The following members were elected to Council after a vote by ballot: Messrs. James Brown, Glasgow; John M'Intyre, Glasgow; John Teape, Glasgow; R. Fife, Kilmarnock; S. M'Gowan, Glasgow, and R. Keillor, Greenock.

A letter was read from Mr. James Lowe, of Auckland, New Zealand, congratulating the Association on having attained its majority, and wishing all prosperity. It will be remembered that Mr. Lowe was the first President of the Scottish Junior Gas Association.

The Chairman then called on Dr. Smith to address the meeting.

CURRENT TOPICS.

By Dr. E. W. Smith, F.I.C., M.I.Chem.E. (Technical Director of the Woodall-Duckham Companies).

On looking back over the last twenty years, one is impressed with the enormous strides that have been made in the "technicalization" of the gas industry. This is not yet complete. The technically-trained man is not yet sufficiently used, and when he is used he is not given sufficient responsibility. This is largely due to the fact that the right type of technical man, having broad views, good personality, and human interests is difficult to get. However, technical men are being employed more and more in connection with the production of gas. More technical men should be employed in connection with the utilization of gas, including its distribution.

I would like to say one word in connection with the duties of those who are responsible for the juniors in the industry. Every encouragement should be given to technical training. The man who is prepared to work in his own time, qualify himself in various ways for the job he holds, and for the jobs he hopes to hold, should be treated differently, from the point of view of salary and advancement, from the man who, while doing his bare duty, has no ambitions, and is little more than a time-server. There is no room in any progressive industry for many time-servers, and the stultifying influence on progressively-minded young men of the "seniority" basis of advancement will have to go.

In speaking of the necessity for technical or scientific training, it is often overlooked that scientific training is not confined to a knowledge of chemistry, physics, and the generally recognized sciences. There is definitely a science of industry, a science of commerce, and a science of business organization and of management. It is not sufficient to work from hand-to-mouth, and deal with the problems that arise, as they arise. An industry, if it is to be anything at all, and progress in the way it should, must have men at the head of its undertakings who plan for the future, who organize before the event, who shape the fate of their industry, rather than allow external influences to shape it and them. Our industry is exactly what we shall make it; and I am sure that, with proper foresight, true conceptions, and scientific business organization, it can hold that position which is second to none in our country—a position of directing the utilization of the whole fuel resources of the country.

At present, for various reasons, the British gas industry is further advanced than the gas industry of any other country; but while believing this, I know that in some details other countries have much they can teach us. I am always very much impressed by the organization of the American Gas Association. I have attended a number of their meetings, and know to a large extent the inner workings of their organization. One notes that it has been found possible for those engaged on the contracting side of the American gas industry to associate on an equality in that Institution with those engaged on the gas production side, to the considerable advantage of the industry as a whole. One also notes that the membership is based on individuals and individual qualifica-

tions rather than on the positions men hold. One is impressed by the volume of really valuable committee work that is done, the results of which are published by the Association. One notes that there is a committee of the American Gas Association for every distinctive activity of the American gas industry. These committees are alive, productive, and inspiring to the whole industry. They are vitalized by a selection of individual membership of each committee which is appropriate and conducive to activity and the production of valuable reports. Like all committees, they depend for their success on the energy and capacity of their chairmen and secretaries. To a very large extent these posts are held by highly-experienced, technically-trained young men. The chairmanship of any particular committee cannot be held for more than one year; and there is great competition to make each succeeding year better and more productive than the last.

At the annual meetings each section has its own session, and the reports of the committees have to bear the criticisms of the annual meeting. A little more of the American spirit and point of view would not harm the British gas industry, as I am confident that under such a system the results would be at least as good as those acknowledged to have been attained in the American Gas Association.

The progressive industrialist is a convinced believer in the advantages of gas over solid fuel or oil, and the greatest deterrent to its much extended use is the cost per therm for industrial purposes. In this connection I believe that the whole question of the methods of charging for gas for different purposes is worthy of reconsideration; and I would like to see a committee of the National Gas Council, consisting of experienced business men, working in co-operation with first-class accountants, devising a scheme which should have for its objective the encouragement of the maximum possible sales of gas in all areas. At present there is not sufficient differentiation between the price charged for gas used in small quantities for lighting, and the price charged for larger quantities, such as domestic heating, motive power, and industrial furnaces. In many districts, restaurants, which are commercial and industrial enterprises, and which use annually a great deal more gas than many of the recognized industrial concerns, are paying for gas at the domestic rate. In many areas gas used in fried fish shops is being charged for at the domestic rate. The man who heats the whole of his house by means of gas alone or gas and coke, using up to 20,000 c.ft. per quarter in the winter months, pays the same price for his gas in all areas as the man who uses gas for lighting alone, amounting to perhaps 3000 or 4000 c.ft. per quarter. This does not appear to me to be commercially sound. It is altogether too much of a tax on the general consumer. The larger user, with his comparatively low installation and maintenance cost to the gas company, is paying for the relatively high installation and maintenance cost of the small consumer. This is very well recognized in the electrical industry. The over-all cost of production of electricity depends on very similar factors to the over-all production cost of gas.

It is not to be expected that among our small and moderate sized gas undertakings there will be facilities for getting at the bearing of all factors on one another in connection with the cost of production and sale of gas; but in the larger companies, and in the National Gas Council, which represents the whole, it should be possible for a thorough study to be undertaken of the whole subject, and a report made on the effect of various factors on the selling price of gas, and recommendations prepared as to the possible methods of differentiating between the charges that are justified against various classes of consumers. As an example of the type of thing I mean, it is worth while considering why it is that some foreign countries are able to dump into England goods at a price which is so much lower than that at which the same goods could be produced in England; the difference not being accountable for by the lower wages paid. One European country may be producing a particular type of article which requires plant and machinery of an expensive type. If this plant and machinery were to be used for 8 hours a day, the cost of production would compare with the cost of production in England, and would be economic in its own country. By working that plant and machinery, the interest on which is a big proportion of the total cost of production, for 24 hours a day, the cost of production of the articles made in the extra 16 hours is reduced to a very low figure; and this is approximately the figure at which they can afford to dump these articles in foreign countries.

Some time ago, a large industrial firm desired to utilize gas to the extent of over 20,000,000 c.ft. a year in its process. They could afford to pay 7d. a therm for the gas. The local gas company in looking through its accounts found that, by selling at 9½d. a therm, they made about ½d. a therm profit; and they came to the conclusion that 9d. a therm was the absolute minimum at which they could afford to sell the gas. During the conference, the question was asked "How much plant have you that is standing idle all the year round, or during any one week?" It was found that there was 25 p.ct. of plant standing idle, on which interest on capital was being paid. The question was also asked "How much is your gas costing you per therm into the holder?" The reply was "2⅜d." It was then pointed out that, as establishment charges, salaries, the distribution system, and interest and depreciation on unused plant were all having to be borne by the gas that was being sold, and not by the gas they were capable of making, it was possible that it would pay as well to sell the 20,000,000 c.ft. of gas per annum at 3d. per therm, as to sell their then output at 9d. per therm. This threw a new light on the whole subject, and from then on the prospective consumer had no difficulty in getting his 20,000,000 c.ft. guaranteed consumption at 7d. per therm.

Our electrical friends have appreciated the importance of a differentiation of rates for some time, and many of the schemes which have been adopted are worthy of very close study on the part of the gas industry. It is well known that some electrical concerns are in effect being subsidized by gas undertakings. It is also well known that some electrical undertakings are subsidized from the local rates. At the same time there are successful electrical undertakings which have adopted systems of charging for electricity such as the Norwich rate, and modifications thereof, which to my mind are sound in principle and excellent in results. One electrical concern in a large city in the North of England is successfully competing with gas for practically all purposes, on a cost basis, because of some such scientific system. I am sure that much more could be done than is being done in this particular direction by our own industry. It may or may not require legislation; but the first requirement is for us to study the subject in all its ramifications, and thoroughly understand it, in order that the best schemes may be adopted.

The cost of industrial gas to the consumer is not the only factor that influences him in making his decision as to whether or not to use town gas in his processes. A great deal still needs to be done in connection with the efficiencies obtainable in industrial furnaces, and there is little need to remind you that, if the amount of gas used in a given process can be reduced to half, the consumer is as satisfied as if the price had been reduced to half. In many cases such a reduction is not possible, but there are a large number of furnaces working in industry at the present time which are giving efficiencies in heating, quite apart from particular methods of working the process, which are from 20 to 60 p.ct. better than the general run of furnaces.

The furnace business cannot be run on similar lines to the gas cooker or fire business. The large bulk of the latter is done through the gas companies, everything is standardized, and except for minor adjustments for varying quality of gas and pressure, a gas fire and a cooker which give satisfaction in one locality may give equal satisfaction in another. Consequently mass production is possible with such apparatus, and little technical supervision is necessary, either in the specification for room heating or cooking, or in the actual fixing of the appliances. This does not hold in furnace work. Practically every furnace has to be specially constructed for the job it has to do, and every furnace should be started up in the first instance by a highly-specialized furnace expert.

There is excellent furnace equipment on the market made by one or two experienced firms. There is also a great deal of rubbish, just as there is on the lighting burner and fittings side. The gas companies and consumers look too much to the question of first cost, and too little to the question of upkeep and of obtaining all necessary results and conditions of operation.

I do not intend in this paper to go again into the question of what constitutes first-class furnace design and operation. I would, however, like to indicate to you some directions in which industrial gas is extending in its use. Four years ago, comparatively little gas was used in the printing trade in England. At present British Furnaces, Ltd., alone have over 100 installations in the London printing trade. The new principle of heating, known as surface combustion, but without the employment of the diaphragm, has been successfully applied to junior and senior autotype machines, to Hoe furnaces, to Winkler machines, and to the backing-up furnaces usually employed in the printing trade. In most cases this equipment has displaced coal and coke, with all the consequent advantages of increased output, increase in speed of heating, better conditions in the workshop, freedom from presence of solid fuel, its storage, and any necessity for disposal of ashes. No fewer than 75 printing shops are using this equipment in London. In some cases it has displaced already existing gas apparatus, and the results have been so remarkable that, when they became known, other printing establishments rapidly converted their furnaces from coal, coke, or oil, to gas.

The autotype machines vary in size. They may contain from 13 tons of metal down to 7½ tons. The rapidity of heating with the equipment in question will be appreciated from the fact that 7½ tons of stereo metal are brought from cold to a liquid state, at a temperature of 600° Fahr., in under 1¼ hours; and during the period when plates are being cast, the casting and melting takes place at the rate of 420 lbs. of metal per minute. During the ordinary working week these baths of metal are kept liquid during the day, while the furnaces are not in operation, and the gas used for maintaining fluidity and for melting the metal during process work corresponds to 1 c.ft. (500 B.Th.U. gross) for every 10 lbs. of metal melted. During the working period, and excluding the gas used during

the stand-by period, the quantity of metal melted per c.ft. is as high as 26 lbs. By substituting this equipment throughout their furnaces, one large printing organization state that they are saving over £2000 a year on gas consumption alone, equal to 24,000 c.ft. of gas per week on each of 9 furnaces. But this is not the only saving. It was common in the printing trade for the cast-iron pots to fracture, due to irregular and local heating. These pots are valued at between £50 and £60 each, and one firm alone, over a lengthy period, lost one pot per fortnight, which was shown in their books as being a net loss of £1248 per year. British Furnaces have had their equipment in use now for over three years, and there has not been a single instance of a fractured pot. In order to gain confidence, it is necessary that the furnace builder shall be prepared to give guarantees. If he does not fulfil them, he should remove his equipment, and the consumer should be relieved of the cost thereof.

It would be a good thing if industrial concerns in the gas industry were to give a lead in connection with the utilization of town gas for industrial purposes. I am glad to state that Messrs. Thomas Glover, of Edmonton, have converted all their furnaces to gaseous firing, including crucible tinning and dross furnaces. The provincial newspapers are rapidly following the lead of the London newspapers, and many of them are now on gaseous firing. There is no doubt, particularly on high output work, such as that in the printing trade, gas is by far the best fuel. Another point of interest is that in no single instance in the printing trade in London has there been any dismantling of gas equipment due to defect in the last three years; so that the equipment is not only efficient, but it is fool-proof and practical.

Another direction in which gas is being applied with advantage is in connection with steam raising for hotels and industrial concerns where cleanliness and space occupied are of importance. Without feed water heaters, efficiencies can be guaranteed, for load conditions varying from 50 to 100 p.ct. of the capacity of the boiler, of between 85 and 90 p.ct. The water-level in the boiler can be maintained automatically, and the gas consumption regulated by the pressure of the steam in the boiler. A full description of such equipment was given by Mr. James W. Reber before the Midland Junior Gas Association on Feb. 27 (see "JOURNAL" for March 4, p. 529).

The Woodall-Duckham Cochran boiler, which has been modified for gaseous firing, has a special advantage over other gas-fired boilers in that it has a definite combustion chamber, and a refractory radiating bed giving all the advantages of a highly-incandescent coke fire. It is possible in a few hours to convert the boiler from gas to coke, or the reverse—a convenience which is readily appreciated by the consumer.

Another matter on which I should like to touch, which does not come directly under the purview of a junior gas association, but which is of great importance to the gas industry, and about which juniors should be fully informed, if they are to take senior positions, is one which has recently been raised by the tar distillers of Scotland through a paragraph which appeared as an advertisement in the "Evening Times" on Friday, March 6. In this paragraph the tar distillers proved to their own satisfaction that it is much more profitable for gas undertakings to sell crude tar to the distiller than to attempt to supply the requirements of the local surveyors for road tar. The paragraph is a piece of the best special pleading that I have read for some time; but no one should complain about it. It is perhaps worth while, however, putting forward another point of view. Mr. Napier, of Alloa, has stated that gas undertakings can make in some cases 40 p.ct. more profit out of their tar by distilling it themselves for road purposes, than if they sell it as crude tar to the tar distiller; and Mr. Napier has backed up his opinion by installing a plant in which to prepare his road tar.

There is no doubt that many road surveyors have found difficulty in using the reputedly prepared tar with which they have been supplied. The fault itself does not lie wholly at the door of gas undertakings. Much crude tar has been sold by the latter to road surveyors through intermediate channels, and it has reached the surveyors after little or no treatment, and the gas undertakings have received most of the blame. It goes without saying that dehydrated tar, pure and simple, is not suitable for road purposes in most cases, and many dehydrating plants are not capable of producing road tar. It is also incontrovertible that many undertakings have dehydrating plants which are capable of making, and do make, road tar equal to the best that is being produced by any tar distiller. I am speaking with full knowledge and experience of this particular matter. In by far the majority of such cases the profits obtained for the tar produced by the gas undertaking are far in excess of the figure that the distiller can afford to pay for the crude tar. It is obvious that this must be so. The cost of conveyance of crude tar to the distillers' works, and of the prepared tar from the distillers' works to the road surveyor, in practically all cases, is considerably greater than the cost of carriage of prepared tar from the works of the gas undertaking to the local surveyor; and the crude oils obtained during distillation are still available for sale to the distiller. The road tar market is a seasonal trade, and the multiplicity of gas undertakings have in total not only better storage facilities than the small number of distillers, but these facilities are geographically very much better dispersed and placed for the convenience of the road surveyor.

The advertisement in question stated that "Dehydration, by the very nature of the process, is incapable of producing a properly distilled tar of uniform quality suitable for roads." This is perfectly correct, but no gas engineer sells dehydrated tar as such, if he is asked to supply tar which shall conform to the Road Board Specification; and he is just as capable as the tar distiller of producing, where suitable plant has been installed, tar of a satisfactory and uniform quality, particularly in view of the fact that he is dealing solely with his own crude tar, and not with varying qualities and quantities of different tars from different works.

As regards the production of special road preparations such as bitumen mixtures and "filled" tars, these have been made for some time by the Glasgow Corporation Gas Department, and bring at least as high a price as reputedly similar preparations made by the Scotch tar distillers. Many of the smaller undertakings—such as Dunfermline, Alloa, and Dundee—are following the lead given by the Glasgow Corporation.

The advertisement in question pleads that the "bulk of the crude tar produced is at present sold by gas undertakings on a sliding-scale, rising and falling with the values of pitch, oil, and naphtha month by month, and these values must always be the basis governing the price of tar." This is not quite correct, because values of pitch, oil, and naphtha have not necessarily any relationship to the value of prepared tar for road purposes; and the prices obtained for prepared tar have, in the past, been such as to show a considerable margin over those received from the tar distiller for crude tar. This can be readily realized when it is appreciated that the cost of conversion of crude tar to prepared tar for road purposes, and to meet the Road Board Specification, unless the crude tar is very high in water, is practically covered by the value of crude benzole, &c., obtained during this treatment. If gas undertakings thoroughly study the requirements of the Road Board, they are capable of enhancing the value of their tar, and are also in the happy position of being able to vary slightly, at the request of the road surveyor, the quality of their product.

There has been a great outcry during recent years concerning the necessity for smoke abatement. With this outcry the whole gas industry is in agreement. The one contribution that the industry has made up to date—and it is a very big one—is to advocate the use of gas wherever possible; but it must be remembered that in the production of town gas it is necessary to produce coke, and coke is the greatest asset that gas undertakings have. It is nevertheless looked on as being a worry and a nuisance in many cases. In the past coke has either been shipped abroad or used largely in industrial processes.

The smoke nuisance is largely caused by the 38,000,000 to 40,000,000 tons of coal which are used throughout Great Britain in the domestic fire; and until this tonnage is materially reduced, there is no hope of abating the smoke nuisance. Now, the gas industry has for sale approximately 8,000,000 tons of coke annually. There are periods in the year when many concerns accumulate large stocks of coke. There are other periods when stocks are depleted. The prices obtained vary almost universally with the stocks held. The sale of coke is also widely influenced by the condition of trade.

You will agree with me when I state that, if coke could be used in place of coal in the domestic grate, not only should we obtain a comparatively smokeless fire, but the demand for coke would vary with the demand for gas, and therefore correspond with its production. There will also continue to be a demand for coke for industry; and assuming that in the very near future 10 p.ct. of those using coal in the domestic grate were to be converted to the use of coke, the whole of the available gas-works coke would be absorbed at an average price greater than that obtained at the present time. What is to prevent such a state of things coming to pass?

The principal objections to the use of coke as a substitute for coal are:

1. Its high moisture content.
2. Its poor grading and screening.

From a large amount of experimental work I have personally carried out, I am confident that, if coke of a regular and uniform size of ¾ in. up to 1¼ in., large coke being broken when necessary, and with a moisture content no higher than 5 p.ct., were put on the market, acceptable fires would be obtained in by far the majority of standard grates. The gas industry would then not only supply gas for most purposes, but would also supply coke, and would have gone a long way towards the ideal of its becoming the sole providers of domestic and industrial fuel.

Discussion.

Mr. JAMES GRAHAM (Kilmarnock), thanking Dr. Smith for his address, commented on the fact that gas engineers' activities were hampered by the various committees which at times were not as interested as they might be in the general welfare of the industry. He suggested that the hire-purchase system might be advantageously used to induce consumers to fit industrial appliances.

Mr. R. GRAY (Hamilton) asked Dr. Smith if he could say that a large-unit gas-fired boiler capable of heating a hall for about 2000

people was economical, and if the present quality of dehydrated tar sent out from gas-works could compare with others on the market for road purposes.

Mr. Simpson (Greenock) asked Dr. Smith if he had found coke suitable for domestic fireplaces.

Dr. Smith, with regard to Mr. Gray's question about the boiler system, said that, if the cost were taken on purely a fuel basis, then it was not economical to instal a gas-fired boiler, but attention must be given to labour values, available space, &c.; and when these were all taken into account, there was no doubt about it that gas was the cheaper way of heating large places. With regard to coke for domestic fires, Dr. Smith instanced the recent exhibition at Manchester, where a coke fire was used continuously for 14 days, and the cost worked out at about ½d. per hour.

On the motion of Mr. M'Isaac, a hearty vote of thanks was accorded to Dr. Smith for his address.

YORKSHIRE JUNIOR GAS ASSOCIATION.

A meeting of the Association was held on Saturday, April 18, over sixty members (under the presidency of Mr. E. Gillett, Bradford) assembling at the engineering works of Messrs. J. Blakeborough & Sons, Ltd., of Brighouse. Among the visitors was Mr. W. B. M'Lusky, the Engineer and Manager of the Halifax Gas Department, who is the representative of the Manchester District Institution of Gas Engineers on the Council of the Yorkshire Junior Association.

On behalf of the Directors of the firm, Mr. C. J. Vickers welcomed the visitors, who then made a tour of the works under the direction of Mr. Vickers and Messrs. H. Tart, H. Stott, and A. Hopkinson.

Messrs. J. Blakeborough & Sons, Ltd.

In 1886 the firm was launched under the title of J. Blakeborough & Sons. Situated in the centre of Brighouse, the premises were known as the Commercial Iron and Brass Works up till 1890, when Messrs. Blakeborough finally vacated them. As the business grew, the old site became crowded up, and in 1875 it was decided that new premises must be built where expansion would be unrestricted. Land beside the main line of what is now the London, Midland, and Scottish Railway Company, at Woodhouse, was purchased, and an iron foundry was erected and equipped. In 1892, mechanics' shops and pattern-making shops were built alongside the iron foundry, and since then extensions have been practically continuous up till a recent date. During the war large additions to the premises were made to meet the demands of the British Admiralty; the adjoining site formerly occupied by the Rastrick Gas Company's works being incorporated, together with the intervening street. Later, the firm became associated with Messrs. George Kent, Ltd.

Woodhouse Works.

Started as an iron foundry to relieve the pressure on the Commercial Iron and Brass Works, Woodhouse Works now occupy an area of about 13 acres. The site was well chosen; it adjoins, on one side, the main line of the London, Midland and Scottish Railway Company, and on the other the canal that runs from the Humber to the Mersey, connecting Hull and Manchester. A siding from the railway penetrates to the heart of the works, affording facilities for the transport of raw materials and finished products, and forming, in fact, a private railway system operated by the firm's own steam locomotive.

In addition, a tramway system is laid throughout the whole works, serving for the transport from department to department of parts in course of manufacture. Woodhouse Works is a compactly organized establishment. Offices, power-house, pattern-making department and stores, foundries, machine shops, brass department—comprising foundry and machine shops—testing department, laboratory, erecting and dispatch departments, are all grouped in due order, constituting a complete unity.

After the inspection, the visitors were entertained to tea in the workmen's large canteen.

Mr. Gillett said he was surprised at the magnitude of the firm. The shops, and the well-organized system of production, were certainly worth seeing; and he felt sure that every member had benefited considerably by the visit.

Mr. J. B. Balmforth (Bingley), proposing a vote of thanks to the firm, said that Messrs. Blakeborough's was a name well known throughout the whole engineering profession.

Mr. T. Clarke (Brighouse) seconded the proposition, and paid a fine tribute to Messrs. Blakeborough's for the quick and efficient service they rendered to gas-works generally. Regarding the merits of their valves, he had always found them to be effective and reliable.

Mr. Vickers, responding on behalf of the firm, said that if the members had enjoyed the visit, the firm were amply repaid.

Midland Association of Gas Engineers and Managers.—The spring general meeting of the Association will be held at Oxford, on the invitation of the President, Mr. W. E. Caton, and the Chairman and Directors of the Oxford Gaslight and Coke Company, on Thursday, May 7.

PROGRESS OF APPLIED CHEMISTRY.*

A Few Extracts.

The Annual Reports of the Progress of Applied Chemistry, issued by the Society of Chemical Industry, are authoritative reviews packed with useful information on which complete reliance can be placed. In Vol. IX., which has just been issued, the section on Fuel is contributed by Prof. J. W. Cobb and Mr. H. J. Hodsman, of the University of Leeds, and that on Gas, Destructive Distillation, and Tar Products by Dr. W. B. Davidson. Each constitutes a concise account, together with critical comment, of all the more important developments which took place in 1924 in these particular branches; and all who wish to be well informed on these matters will find the reviews of the utmost value.

Power Production.

It is, of course, neither desirable nor necessary to recapitulate what is set down in these two sections; but attention may be drawn to one or two points. It is only a matter of a few weeks since a descriptive article of the Brunler submerged-flame boiler appeared in the columns of the "Journal" (March 11, p. 508). Such a method of power production, state the authors of the section on Fuel, would demand a fuel freed from sulphur to a superlative degree; and even then it could not be assumed that trouble from the acid oxidation products of nitrogen and from hydrogen peroxide would be non-existent. In dealing with power production, they mention the mercury-vapour turbine due to W. J. Kearton. This works between temperatures in a range above the boiling-point of mercury; the vapour expanding into a condenser functioning as a steam boiler, the steam output of which drives a turbine of the normal type. "While novel and revolutionary methods of improving the efficiency of methods of utilizing fuel by means of steam engines naturally excite great interest," state the authors, "it remains true that the economy most easily effected is the operation of ordinary plant to the best advantage. It is notorious that, if the general standard of steam production were merely brought up to what is good boiler-house practice, great savings in fuel would result."

Carbonization.

The heat change which accompanies the carbonization of coal has been the subject of a number of researches both on the laboratory and the industrial scale. Some years ago H. Hollings and J. W. Cobb, by applying a differential method, divided the carbonization process into stages in which heat change was either exothermic or endothermic. In this research a quantitative estimate of the heat involved in the different stages was not attempted, but it was concluded that the total heat of the reactions was small. The subject has been recently examined again with considerable refinement at the U.S.A. Bureau of Mines Station, Pittsburg, by J. O. Davis and P. B. Place, who measured the heat change at different temperatures calorimetrically. The results showed that the reaction heat was in any case small compared with the total heat effects in the process, and in practice negligible. At low and high temperatures of carbonization the process was endothermic; at intermediate temperatures (500° C.) exothermic.

On the subject of low-temperature carbonization, mention is made of the extensive examination, made by K. B. Edwards, of a blast-furnace tar, Coalite tar, and tar from a Maclaurin plant and from continuous vertical retorts. All were found to be essentially of the same character, yielding, except for the higher phenols of the fuel-oil fraction, products of a low value. Phenol itself and other products of known technical value were absent.

Very interesting are the remarks on coke and its combustibility. The character of coke, it is stated, is open to considerable modification depending on conditions of carbonization. Formerly it was thought that temperature, and in consequence volatile matter, was the governing factor; but recent experience shows that a suitable texture is essential, whether produced by grinding, blending, the incorporation of catalysts, or more obvious methods such as the choice of coal, and thermal treatment. There is insufficient information available at present, both as to the full effect of the numerous factors involved in the carbonization process and on the financial balance-sheet, to permit an opinion as to the comparative value of the different treatments suggested. They offer most promising avenues for technical advancement in the carbonization process.

Speaking of waste heat, the authors state that the application of waste-heat boilers to horizontal retort settings has not been developed to any great extent, though there is here a vast quantity of potential heat available for raising steam, or other purposes. The divorce of the industries of carbonization and electrical power generation is unfortunate, for it impedes developments of this kind which might be mutually advantageous.

Inerts.

Dealing with this question, Dr. Davidson refers to the work of W. Bertelsmann on the influence of inerts in the practical

* Reports of the Progress of Applied Chemistry, issued by the Society of Chemical Industry. Vol. IX.—1924. Edited by T. F. Burton. Price 7s. 6d. to members of the Society, 12s. 6d. to non-members, post-free.

uses of gas, which, he says, is calculated to alter the general opinion of technical men in Germany, and confirm that of many in this country who of late years arrived at the conclusion that the objections to the inclusion of inerts in town gas have not been well justified. Bertelsmann compared straight coal gas with mixed gases. Illumination tests proved that thermal efficiency was distinctly greater with poor than with rich gases. When the illumination of an upright incandescent burner was adjusted to give its maximum candle-power, it was found that gas containing about 20 p.ct. of inerts had the same efficiency as a hydrogen mixture with practically no nitrogen in it. In tests of the heating of water from 20° to 70° C., efficiencies increased with a decrease in calorific value. In another series of tests where calorific value was kept constant and the volume of inerts made to vary, it was found that with gases diluted with hydrogen 96 calories were required to raise 1 kg. of water through 75° C., whereas gases containing about 21 p.ct. of inerts required about 98 calories.

Dr. Davidson considers at some length the three Cantor Lectures of Mr. E. V. Evans on "A Study of the Destructive Distillation of Coal" [see "Journal," Vol. 165, pp. 483, 550, 629]; and his remarks on this take the form of a résumé of the articles which were published in the "Journal" [see Vol. 167, pp. 447, 515, 580.]

Speed of Carbonization.

Speaking of the various patents taken out during the year to improve the rate of carbonization and to obtain graded distillation in zones, Dr. Davidson mentions the method suggested by Green and Laucks, which involves the use of a vertical retort in which the coal is passed upwards by means of a hollow screw. Simultaneously with the heating of the coal by conduction through the retort walls, heat is applied to the interior of the screw by means of an adjustable burner. The pitch of the screw gradually increases from the lower to the upper end of the retort; and the bore of the retort gradually increases from bottom to top, the diameter of the screw varying correspondingly. Attention is also drawn to T. M. Davidson's proposal to have the surfaces of the retort movable, to increase throughput. A vertical or inclined retort has longitudinal sections which are capable of reciprocatory movement, and the products of distillation may be taken off by a central tube, which may be raised or lowered to any carbonizing zone. The whole retort is divided into lengths of uniformly increasing temperature, and the gases of distillation pass in the direction of movement of the coal, and are withdrawn at or below the highest temperature zone.

Oil Shale For Gas Production.

Many facts and figures with regard to the present position of the oil shale industry in Esthonia are contained in a paper submitted by Mr. P. N. Kogerman, M.Sc. (Lond.), to the Institution of Petroleum Technologists. Though the Esthonian oil shale, known as "Kukersite," was discovered more than a century ago, it was only during the late war that its importance as a substitute for coal and as a source of gas and oil production came into prominence. At that time, after trials of the material on a large scale had been carried out at the Petrograd Gas-Works, it was decided to embark on an extensive mining scheme, which events precluded from being taken actually in hand by the Government until May, 1919. Since then the exploitation of the oil shale has continued without interruption; and the annual output has now reached a very considerable figure. The probable resources are calculated at about 5000 million tons. The consumption of "Kukersite" as a fuel for all kinds of boilers has been steadily growing; while the gas-works at Tartu (Dorpat) and Tallinn have partially adopted it for gas production—though for the latter purpose coal is preferred because it produces coke and avoids the cost of ash removal. The author gives the following as the chemical composition of oil-shale gas:

	P.Ct.
Hydrogen	37·6
Methane	25·8
Heavy hydrocarbons	1·6
Carbon monoxide	19·1
Carbon dioxide	13·3
Nitrogen	2·6

In the gas-works named, the material is dealt with in old-type horizontal retorts, which are not altogether suitable for the carbonization of shale. The yield of gas is 10,000 c.ft. per ton; and of tar, from 4 to 5 p.ct. Several plants for the distillation of shale oil are at work in Esthonia—including an installation of "Fusion" retorts, some figures with regard to which appeared on p. 149 of the "Journal" for Jan. 21 last, in connection with a paper read by Mr. T. W. Stainer Hutchins at a joint meeting of the London Section of the Society of Chemical Industry and the Chemical Engineering Group.

North of England Gas Managers' Association.—The annual general meeting of the Association will be held on Friday, May 1, at the County Hotel, Newcastle-on-Tyne. Mr. S. Shadbolt, President, will take the chair, and two papers will be read—one by Mr. C. Dru Drury, of Sunderland, on "Some Experiences with Gasholder Tanks in a Mining Area;" the other by Mr. W. M. Galleway, of Whitby, on "Income-Tax Allowance for Wear and Tear of Gas-Works Plant."

THE NATION'S FOOD EXHIBITION.

The remark is often heard that life would be simpler and better if a day's supply of food, in the form of compressed tablets of vitamines, proteins, &c., &c., could be carried in the pocket. This plan might have advantages; but when one reflects on the delightful hours spent in human contact at tea or at dinner—the subject of breakfasts need not be dwelt upon here—the idea of tabloid-swallowing loses any attraction it may seem to possess. The mellow sayings of the old philosophers, the brilliant epigrams of the wits of the day, even the broad but kindly jests of the man of the soil—where would they all be, but for the humanizing and stimulating effects of good food and good drink? And in times of stress such as the present, it is good to think that the work of preparing meals has, thanks to the aid of gas, been so lessened that it no longer entails the nervous prostration of the housewife. Realization of this is strengthened by a visit to the Nation's Food Exhibition at Olympia. During the course of a year, Olympia undergoes many transformations. It changes, with the rapidity of a chameleon, from a hall where the latest developments of engineering can be seen to a place where the ideal home can be visualized. At present it is a palace for epicures; and for the sake of the nation's health all should be epicures in respect of food—they should prefer good food to bad. The Nation's Food Exhibition assists the public as to what to buy, where to buy, and what to pay; and visitors are inducted into the very interesting processes of manufacture of the many varieties of foodstuffs.

The "B.C.G.A." Exhibit.

When the present iron-roller system of flour milling was introduced in England about fifty years ago, the English miller claimed that there could be nothing better for grinding wheat than the time-honoured millstones, by the use of which the valuable food constituents of the grain were retained in the meal. The roller system has certainly led to the almost exclusive production of a white flour containing little of these elements. Wholemeal flour, however, as ground in millstones, even with much of the bran sifted out, is somewhat heavy; and this applies particularly to British wheat, which is naturally soft. It would seem, therefore, that there is a necessity for a new mechanical means by which a really pure and satisfactory wholemeal flour can be efficiently and economically produced. With this object in view the "Kek" mill has been specially adapted. It is manufactured by the Chemical Engineering Company, Ltd., of Manchester. This firm show how, with a gas-engine driven mill, good flour can be produced; and the British Commercial Gas Association, on the same stand, demonstrate how efficiently this flour can be baked in the gas oven. The appliances employed for the work are two "New World" raised cookers, and the cakes made are sold to the public. The combined exhibit is excellently arranged, down to the smallest detail. A Richmond water heater is used for washing-up purposes.

Other Exhibits of Interest.

Two exhibits of Messrs. Radiant Heating, Ltd., who show a representative selection of their apparatus, which is well known to gas engineers, are of particular interest. One is a water heating unit. This is in the form of a totally immersed tube, and the gas burns in contact with its own products of combustion. The other is a toaster and griller which is a new departure in that it does not require additional air pressure. The National Gas Engine Company have a 2¼-kw. lighting set consisting of a standard National town-gas engine and chain-driven dynamo. The set is supplied with a totally-enclosed silent inverted tooth chain running on machine-cut chain wheels. There is also an "RL" type town-gas engine, embodying all the latest improvements, and capable of developing 32 B.H.P. Messrs. Benham & Sons, Ltd., make a special feature of their "Victor" dish-washing machine, which can be heated by gas. This efficient apparatus is installed at the Hotel Cecil, Messrs. Selfridge, Ltd., and many other important establishments, and on many liners. They also show a general range of their gas-fired appliances, including pastry ovens, &c. Gas-fired chip potato ranges and heavy gas ovens are shown by Messrs. Mabbott & Co., Ltd. "Cling-Surface" preparation for belts, enabling them to transmit 100 p.ct. load while running slack, and "Permac" jointing material are exhibited by Messrs. Thomas & Bishop, Ltd. Industrial trucks of all descriptions are shown by Messrs. W. Goodyear & Sons, Ltd.; a special feature being the Goodyear-Greenbat electric truck.

Safeguarding of Gas Mantles.—The Board of Trade have appointed a Committee, consisting of Sir Frederick Mills, Sir John Barran, and Mr. J. Arthur Aiton, to inquire into and report upon an application made by the Incandescent Mantle Manufacturers' Association for the imposition of a duty upon gas mantles. The Secretary to the Committee is Mr. C. K. Hobson, Board of Trade, Great George Street, London, S.W. 1, to whom all communications relating to the work of the Committee should be addressed.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Electrical Explosions.

Sir,—In your issue for April 15 there is a paragraph in the Electricity Supply Memoranda dealing with the cause of explosion in cable conduits. Some time ago a possible immediate cause came to my notice; and as I have not seen any mention of a similar case elsewhere, I think it should be put on record. An electrical fitter brought me a small piece of pasty material which he had found adhering to the side of a bricked manhole through which access to a conduit was gained. His attention had been attracted to it when a similar piece, thrown out on to the roadway, had fallen into a pool of water, and apparently given out sparks. On examination I found the paste contained metallic sodium—no doubt from the electrolysis of some sodium salt contained in the materials of the conduit, by stray currents from a fault in the cable. Dropping water on to the mass caused a copious shower of sparks. The effect of such an occurrence on any explosive mixture of gases in a closed conduit requires no further comment.

Arthur Forshaw.

Falkirk, April 23, 1925.

Hiring Charges and Installation Delays.

Sir,—I have read your criticism of electric cookers on pp. 173-4, and am glad to learn that you consider all arrangements made for supplying gas-cookers absolutely perfect.

When you quote the trifling sum of £4 for a gas-cooker, I begin to wonder what kind of gas-cooker it is. I have yet been unable to discover a sample which is at all efficient under £10. In my area, the Gas Company have discarded the hiring system, and the householder must buy the gas-cooker outright, and wait a minimum of three weeks for installation. I think you could devote your energies to the question of delivery dates in the supply of gas appliances, since I, at least, consider that three days is a reasonable period for installation, and not a general average of three weeks. The gas industry, as far as the area in which I live is concerned, only requires a little publicity with regard to its delivery dates to be discredited.

As to the hiring of gas fires, which is a matter you overlook, I find myself saddled with the trifling sum of 32s. per annum for the hire of two gas-fires, which are not at all efficient. You will note that 32s. is equivalent to an interest charge, at a rate of 6 p.ct., on a capital sum of £27. Even allowing for depreciation, you will see that no electric fires can compare with those gas-fires in price. There are few electric fires on the market which cost more than one-sixth of this sum. The gas industry has a long record of profiteering to overcome in the hiring of apoliances especially and of inefficiency in installation before it can criticize the electrical industry; and I think you could devote some part of your musings to working conditions in the gas companies of the Metropolis.

Hugh Quigley.

London, April 21, 1925.

[We are not clear as to why our correspondent considers that the criticisms made in "Electricity Supply Memoranda" for April 15 of a paper by Mr. R. Hardie, of Glasgow, gave the impression that we regard as absolutely perfect all arrangements made for supplying gas cookers. Throughout the criticisms there was no indication of such an idea on our part. Indeed, constant readers of the "Journal" know full well that we are frequently pegging-away at gas undertakings which are negligent as to the service they render to consumers, while at the same time praising those go-ahead ones which take a pride in building-up a reputation and permanent business by looking well after the interests of their patrons. As to the price of gas cookers, we were unaware that we gave £4; it was Mr. Hardie who quoted that figure for a gas cooker, and £12 10s. for an electric cooker. Mr. Quigley wonders what kind of gas cooker a £4 one can be, as he has not yet been able to discover one which is at all efficient under £10. We think that, if he applies to any of the well-known makers of gas cookers, they will be able to introduce him to several types which can be purchased for much less than £10. One large maker quotes a little over £3 for single case cookers, and about £6 for double case ones in much better finish. Quite modern cookers, giving the consumer high efficiencies and with modern accessories, can be bought for £7 to £8; and much more expensive ones can be obtained. But there is not at all a bad selection of cookers suitable for hiring purposes which are purchasable at round about the £4 mentioned. If our friend would like a cooker with the oven externally heated, we can introduce him to some at prices ranging between £8 8s. and £10, or higher prices still. The higher prices for modern types are usually due to size, more accommodation, and finish, rather than to a greater thermal efficiency. As to our correspondent's general criticism of the Company supplying in the district in which he resides, any grievance he has is purely a matter for him to settle direct with the Company. But we would suggest to him that he would find it more profitable to purchase outright two good gas fires than to continue paying the rental figure to which he refers. Of course, we do not know the conditions attached to the charge—whether or not it includes the periodical inspection, adjustment, and maintenance of the fires. But as to their being not at all efficient, there is no reason why any gas fire should be in existence which is not giving to the room in which it is used 70 to 75 p.ct. of the heat generated by the combustion of the input of gas. With confidence it can be claimed that we have had personal experience of a greater number of gas fires than our correspondent, and over a course of years no doubt far exceeding his acquaintance with them. We are always able to obtain from them a high degree of efficiency with gas of a calorific value of 500 B.Th.U. per c.ft. Whatever grievances our correspondent has against his own Gas Company should not be used as representing general conditions throughout the gas industry.—Ed. "G.J."]

REGISTER OF PATENTS.

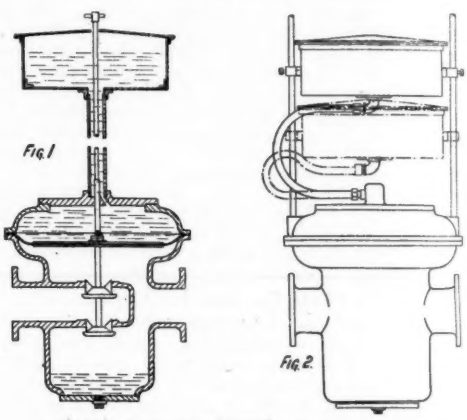
Loading Governors.—No. 230,266.

Keith & Blackman Co., Ltd., and Keith, G., both of Farringdon Avenue, E.C.

No. 5590; March 4, 1924.

This invention relates to a diaphragm loading arrangement for gas governors and other valve apparatus of the type including a diaphragm in the form of a flexible membrane subject to gas or air pressure and loaded by a liquid head.

The arrangement includes a tank mounted above the diaphragm casing and connected to one compartment of the casing by a tube, and of such cross-sectional area in relation to that of the membrane that the rise and fall of level in the tank will correspond approximately with the stroke of the membrane, whereby equality of pressure may be maintained notwithstanding that varying quantities of gas may be passing the governor or valve; the cross-sectional area of the connection between the tank and casing being such as to produce a dash-pot action.



A Keith-Blackman Governor with Liquid Loading.

Fig. 1 is a cross-section of one form of the apparatus. It will be seen that the tank is covered and a sump provided, in case of rupture of the diaphragm. Fig. 2 shows an arrangement for varying the head of liquid; the connection being by flexible tube or telescopic pipe.

Screening Coke, &c.—No. 230,632.

Drakes, Ltd., of Halifax, Walker, A. B., of Newcastle-on-Tyne, and Walker, A., of Raynes Park, S.W. 19.

No. 7318; March 22, 1924.

This invention relates to screening apparatus of the type described in specification No. 8439 of 1914 [abstracted, with drawings, on p. 409 of Vol. 130 of the "Journal."]

The patentees now claim, as modifications, the employment of adjustable fingers and means for securing same so that openings of the sieve may be increased or decreased in width; and the employment of additional finger pieces having slots to permit of their adjustment relatively to the pieces on which they are mounted, and bolts for securing them.

Extraction of Coke from Vertical Retorts. No. 230,518.

Woodall, Duckham, & Jones (1920), Ltd., and Sir Arthur M'D. Duckham, both of Grosvenor Gardens, S.W. 1.

No. 28,529; Nov. 12, 1923.

The patentees point out that one method of governing the issue of coke from the lower end of a continuous vertical retort consists in making the bottom of the retort a separate piece carried in a gas-tight casing by a support capable of vertical reciprocating motion within the stationary casing. According to the present invention the casing is made the reciprocating part, and its bottom the bottom of the retort; the arrangement avoiding the necessity for removing the coke from a gas-tight casing.

The casing which has received its charge of coke is removed from

the retort; and its place is taken immediately by another, or it is emptied quickly and replaced. Inserted bars temporarily support the charge in the retort during the removal of the casing.

Conveniently, the casing also forms the necessary seal for the bottom of the retort. To this end there may be a fixed depending mouthpiece, or extension of the retort, surrounded by a metal curtain, and the vertical walls of the container may be double so as to hold water into which the metal curtain dips.

To prevent the entrance of air into the retort when the container has been removed, steam jets may be provided in the extended portion of the retort, the jets producing a slight pressure.

Purification of Crude Ammoniacal Liquors. No. 230,705.

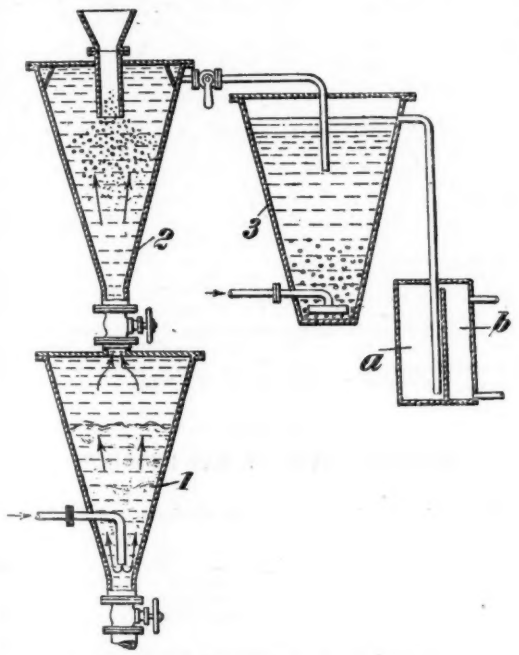
POTTS, H. E., of Liverpool.

(A communication from Z. M. STINNES, of Essen-Ruhr.)

No. 17,742; July 25, 1924.

This invention is for a two-stage process of purification for crude ammoniacal liquor. The tarry matters are first removed and the phenols are then extracted in a substantially pure condition. In the first stage the crude ammoniacal liquor is treated with a solid adsorbent, such as calcium carbonate, alumina, sawdust, wood-charcoal, &c., which fixes and binds the finely divided and suspended tarry drops. The dirty mass thus produced is separated in the usual manner, and the clarified ammoniacal liquor is now, in the second stage of the process, extracted with a solvent such as benzene, preferably at an elevated temperature, whereby the phenols are quickly dissolved. The mixture of the two liquors is allowed to separate under gravity, and from the benzene extract the phenols are obtained in a pure state by distilling off the solvent, while at the same time the benzene is not adulterated by tar and can be used again for another operation without purification.

In practice the process is carried out either intermittently or continuously—preferably the latter, for which the apparatus shown in the accompanying drawing is claimed.



Purifying Crude Ammoniacal Liquor—Stinnes.

The adsorbent is fed into the container 2 by means of a funnel having an elongation. The crude ammoniacal liquor enters the bottom of the container 1 by way of a pipe bent downwards. It continually flows upwards and meets in a counter-current the adsorbent, of which a portion gradually sinks downwards into the container 1. The rate of flow of the liquor is regulated in such a manner that the greater portion of the adsorbent is kept in suspension at about the middle of the container 2, where it adsorbs the tarry matter, together with which it gradually sinks down as a greasy mass into the bottom of container 1, whence it is run off from time to time by opening the bottom valve.

The ammoniacal liquor thus freed from the tarry matter overflows from container 2 into another container 3 of similar shape; the adsorbent being retained in container 2 by a screen or sieve. At the same time benzene in a finely divided state is allowed to rise in pearly drops (by means of a pipe and rose) from the bottom upwards in the container 3, where it extracts the phenols dissolved in the aqueous liquor. The mixture of water and benzene is continually withdrawn and run into the bottom of a tank provided with a division wall, so that the aqueous liquor can overflow from the compartment *a* into *b*, in which latter compartment the separation of the benzene top layer from the aqueous bottom layer is effected. The benzene extract is run off into a collecting tank and thence to a distilling apparatus to recover the benzene (for re-use) and the phenols, while the purified ammoniacal water is carried away and treated for the production of ammonia.

The ammoniacal liquor before entering the top container 3 should be warmed to 40° to 45° C., so that the benzole drops may ascend through the warm water, whereby a great saving of time and benzole is effected.

The waste water from the ammonia stills can then be run into (say) a river, and, being free from tar, phenols, &c., can do no harm to the fishing industry.

Gas Cookers.—No. 230,921.

HELPS, G., of Nuneaton.

No. 31,929; Dec. 20, 1923

According to this invention, which has for its object to allow hotplates of a standard size to be used for cookers of varying size, a hotplate with its burners forms a separate entity, detachable from the cooker, and is so carried by a base plate, a frame, or two strips, that it can rest on the cooker, to which it may be secured by screws. The hotplate may be so supported on the base plate, frame, or strips as to provide a channel in which a crown plate can slide.

The arrangement allows a large hotplate to be conveniently supported from the top plate of a small cooker, or a small hotplate to be supported on a larger cooker, and in each case fixed in a few moments.

APPLICATIONS FOR PATENTS

[Extracted from the "Official Journal" for April 22.]

Nos. 9591 to 10,183.

ALLOTT, G. W.—"Manufacture of coal gas." No. 10,046.
BADER & SALAU.—"Production of air-gas mixtures." No. 9677.
CARPMAEL, W.—"Distillation of bituminous materials." No. 9964.
CHASE, F. C. B.—"Gas-heated soldering-irons, &c." No. 9978.
CORNES, J.—"Gas saver." No. 9875.
COX, K.—"Recovery of benzole, &c., vapours from gas-vapour mixtures." No. 9966.
ENOCH, A. G.—"Air or gas compressors." No. 9632.
GUHLER, R.—"Gas burners." No. 9942.
HELPS, G.—"Gas burners." No. 10,019.
JACKSON, W. J. MELLERSH- (KOPPERS COMPANY).—"Aeration and gas purification." Nos. 9675, 9679, 9694.
JACKSON, W. J. MELLERSH- (KOPPERS COMPANY).—"Gas purification." Nos 9681, 9701.
JACKSON, W. J. MELLERSH- (KOPPERS COMPANY).—"Gas and liquid contact apparatus." No. 9690.
JACKSON, W. J. MELLERSH- (KOPPERS COMPANY).—"Removal of hydrogen sulphide, &c., from gases." No. 9698.
M'DERMOTT, P. J.—See Cox, K. No. 9966.
MACDONALD, F. R.—"Gas fires, &c." No. 9940.
MILES, T. V.—See Allott, G. W., No. 10,046.
PYZEL, D.—See Carpmael, W. No. 9964.
REBER, J. W.—"Waste-heat boilers." No. 9987.
SMITH, E. W.—See Reber, J. W. No. 9987.
TOOGOOD, H. J.—"Stoking-appliances for gas-works retorts." No. 9655.
WOODALL-DUCKHAM (1920), LTD.—See Reber, J. W. No. 9987.

LEGAL INTELLIGENCE.

EXTRACTION OF TOLUOLE.

Dr. Davidson's Claim on the War Office.

On Monday the Royal Commission on Awards to Inventors (presided over by Mr. Justice TOMLIN) heard a claim by Dr. W. B. Davidson for compensation by the War Office in respect of processes for the extraction of toluole from coal gas. Mr. WHITEHEAD, K.C., and Mr. JAMES MOULD appeared for the applicant; Mr. COURTNEY TERRELL and Mr. D. H. CORSELLIS represented the War Office.

Mr. WHITEHEAD said the claim was made under clause 3 of the Royal Commission by the applicant, William Brown Davidson, who was a gas engineer, a consulting chemist, a Doctor of Science, a Doctor of Philosophy, and a Fellow of the Institute of Chemistry. At the time the process was evolved which was the subject of the claim, he was with the Birmingham Corporation. Some time ago there was presented to the Commission a claim on behalf of Dr. Rother and Dr. Palmer, who were employed at the Royal Arsenal, Woolwich, in respect to the manufacture of "T.N.T.;" but the Commission took the view that their status debarred them from obtaining a reward. In the course of that claim, it appeared that the first steps with regard to the manufacture of "T.N.T." were taken quite early after the outbreak of war; and no sooner did it become plain that there was a chance of manufacturing toluole on a large scale, than it became evident that the supply of toluene would have to be considerably increased. This was recognized at the Royal Arsenal; and Dr. Rother at the beginning of November, 1914, communicated with Dr. Davidson with regard to the best means of adding to the supply of toluene. Various suggestions were made by letter, and Dr. Davidson's opinion was asked as to the possibility of obtaining toluene by synthetic processes. In reply, Dr. Davidson criticized the suggestion made; but after thinking about the matter, he evolved the process in question on Dec. 28, 1914. Dr. Palmer was not satisfied with the work; but he thought it was his duty to bring it to the notice of his Chief, and the matter was submitted to Lord Moulton. On Jan. 11, 1915, Dr. Davidson was sent for by Lord Moulton, to whom he explained the process. Lord Moulton was favourably struck with the scheme, because a little later he telegraphed to Dr. Davidson, and arranged for a meeting to be held at the Grand Hotel, Birmingham, at which Sir H. Rogers (the Chairman of the Gas Committee) and Captain R. S. Hilton (the Secretary and Manager) were present. The process was fully discussed, and

in the result the applicant was asked to arrange for the erection of plant at the Nechells Gas-Works. Applicant was also asked to visit the gas-works at Manchester, Sheffield, Coventry, and other towns, to explain the scheme; and Captain Hilton was directed by Lord Moulton to speed-up the erection of the necessary plant at the different works, in order to carry out the process. It took 3½ months to erect the plant at Nechells, where afterwards the process was carried out. When it was working, it was visited by many English and French gas engineers, with the view of their adopting a similar plan. Dr. Davidson also, at the request of Lord Moulton, proceeded to various parts of the country to give his help and advice with regard to the erection of plant and its working; and he received his travelling and hotel expenses for that work from the Government. The real problem was to obtain as much toluene as possible from the coal gas, and yet to supply a gas which would not be substantially impoverished either with regard to calorific value or light-giving properties. He might mention that no patent had been taken out in respect of the process in question. Counsel produced a diagram, and explained how the process was carried out. He said there was no part of the process, except one, which had not been anticipated; but no one had ever previously carried out the process in its entirety.

Mr. Terrell asked that the invention should be defined, in order that he might deal with it. At present he did not know what it was.

The President understood it consisted of the entire process indicated on the diagram.

Mr. Whitehead said that was so. In order to perform the work, a number of things had to be carried out which involved an immense amount of research work. This was done by Dr. Davidson at his own expense and in his own time.

The President said no claim for expenses could be substantiated in respect of this, except so far as it was incidental to some other claim.

Mr. Whitehead agreed that this was so. The claim made in respect of expenses and research work was £510.

The President pointed out that the actual out-of-pocket expenses had been paid. It might be that Dr. Davidson was not free to contract with the Government, as his services belonged to the Birmingham Corporation. For aught one knew, it might be that the Corporation lent Dr. Davidson to the Government, and put up with the loss of his services on the footing that his out-of-pocket expenses were paid.

Dr. *W. B. Davidson* was then called, and gave evidence in support of his claim. He said the experiments were done at the works in his own time, and he expended considerable sums on apparatus and chemicals. He had never received anything from the Birmingham Corporation in respect of this work.

The hearing was adjourned till Monday next.

MISCELLANEOUS NEWS.

GAS REGULATION ACT APPLICATIONS.

The following notice has appeared in the "London Gazette" regarding an application to the Board of Trade under the Gas Regulation Act.

SPECIAL ORDER.

Bollington Urban District Council.

The Council intend to apply to the Board of Trade for an Order under section 10, to extend their gas supply limits, to authorize the purchase of additional lands, to enable them to charge on the thermal basis, and for other purposes.

TRAGEDY AT NEWPORT.

No Blame Attached to Gas.

On Monday, April 20, an inquest was held at Newport (Mon.) on Mr. F. Vaughan, a well-known Newport and Cardiff solicitor, and his wife, who were found dead in their bedroom on April 16. The tragedy was discovered by Dr. R. W. Haslett, who had for some time been attending Mr. and Mrs. Vaughan for heart trouble, at three o'clock in the afternoon. In giving evidence, Dr. Haslett said that, when he called at the house, the maid told him that deceased were asleep. On entering the bedroom, however, he discovered that they were dead. A gas fire, fully alight, was burning in the room, which was very oppressive; the air temperature being no less than 115° Fahr. Dr. V. A. Crinks, who conducted the post-mortem examination, gave the opinion that death was due to asphyxia from carbon-monoxide poisoning.

Mr. J. H. Canning, the Engineer and Manager of the Newport Gas Company, said that on Friday, April 17, he examined the gas fire, and found it in perfect order. The top of the fire was covered with a deposit of what appeared to be mortar, and a similar deposit lay on the hearth. He tested the chimney for draught, and found it inoperative. The flue was then inspected, and an obstruction was found some 12 ft. above the hearth. This consisted of two or three bucketfuls of sticks, twigs, fine mortar, clay, and the skull of a bird. The latter indicated that a nest had been in the chimney for some time. The nest could not, however, have actually sealed the flue; for on March 11 the fire was examined by one of the Company's fitters, and the chimney draught at that date was perfect. The blockage was probably caused by mortar falling from the portion of the flue above the nest, and closing all the small openings.

The Coroner, Mr. W. Lyndon Moore, D.L., J.P., said that it was satisfactory to know that death was not due to the fault of anyone, but was rather the neglect of the old rule which told them to keep their chimneys clean. It was clear that on March 11 there had been a proper current of air ascending the chimney. No doubt the opinion advanced by Mr. Canning was a sound one.

The foreman of the jury intimated that they were unanimously of the opinion that death was due to misadventure.

METROPOLITAN GAS COMPANIES' OFFICIAL TESTINGS.

The Gas Referees' reports of the official testings for the past quarter give the following average calorific values for the gas supplied by the Metropolitan Companies named.

Brentford Gas Company.—501·3 B.Th.U. (declared calorific value, 500 B.Th.U.).

Commercial Gas Company.—479·8 B.Th.U. (declared calorific value, 475 B.Th.U.).

Gas Light and Coke Company.—501·8 B.Th.U. (declared calorific value, 500 B.Th.U.).

South Metropolitan Gas Company.—562·6 B.Th.U. (declared calorific value, 560 B.Th.U.).

South Suburban Gas Company.—501·5 B.Th.U. (declared calorific value, 500 B.Th.U.).

Tottenham District Light, Heat, and Power Company.—503·7 B.Th.U. (declared calorific value, 500 B.Th.U.).

Wandsworth, Wimbledon, and Epsom District Gas Company.—474·5 B.Th.U. (declared calorific value, 470 B.Th.U.).

BOMBAY GAS COMPANY, LTD.

The report of the Directors, which will be presented at to-day's meeting of the Company, shows a profit of £21,761, which, added to the profit on exchange, £5185, and the balance of £35,051 brought forward from the previous year, amounts to £61,997. After providing for the payment of interest, &c., and the interim dividend paid in November last, and the addition of £1494 to the reserve fund, £997 to the renewal fund, and £184 to the insurance fund, there remains a balance of £46,208, out of which the Directors recommend the payment of a dividend of 4 p.ct. (less income-tax), making 8 p.ct. for the year, which will leave £34,208 to be carried forward to the current year. The Directors announce with profound regret the death of their esteemed colleague and friend, Mr. Henry Edward Jones. They place on record their deep appreciation of the important and valuable services which he rendered to the Company as a Director for a period of 33 years—for 21 years of which he was Chairman of the Board—and their sense of the loss which the Company have sustained by his death. Mr. Stanley Hunter Jones, M.Inst.C.E., has been appointed to fill the vacancy on the Board. Mr. A. R. Burch, the Company's Engineer and Manager in Bombay, resigned his office in October, 1924, owing to ill health. He was the Company's representative in Bombay for 18 years, and fulfilled the duties of his office to the entire satisfaction of the Directors and with great advantage to the Company. They have appointed the Deputy Engineer and Manager, Mr. W. T. Lane, in his place. It is intended to increase the nominal capital of the Company by the creation of new ordinary shares of £1 each.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

London, *April 27.*

Pitch continues without material change. There is still a moderate amount of inquiry for this season's delivery; but buyers' ideas of value are low. The price to-day is nominally 41s. to 42s. per ton f.o.b. works. There is a certain amount of interest being taken already in business for next season.

Creosote is quietly steady at about 7d. per gallon net and naked at makers' works.

Pure benzole and pure toluole remain at about 1s. 10d. per gallon.

Solvent naphtha, 95/160, is firm at about 1s. 8d. per gallon.

Tar Products in the Provinces.

April 27.

The average values for gas-works products during last week were: Gas-works coal-tar, 27s. 9d. to 32s. 9d. Pitch, East Coast, 40s. to 41s. f.o.b. West Coast—Manchester, 35s. to 36s.; Liverpool, 36s. to 37s.; Clyde, 39s. to 40s.; Benzole, 90 p.ct., North, 1s. 6½d. to 1s. 7½d.; crude, 65 p.ct., at 120° C., 10d. to 1s., naked at makers' works; 50-90 p.ct., naked, North, 1s. 6½d. to 1s. 7½d. Toluole, naked, North, 1s. 6½d. to 1s. 7½d., nominal. Coal-tar crude naphtha, in bulk, North, 7½d. to 8½d. Solvent naphtha, naked, North, 1s. 5d. to 1s. 6d. Heavy naphtha, North, 1s. to 1s. 2d. Creosote, in bulk, North, liquid, 6d. to 6¼d.; sally, 5¾d. to 6¼d.; Scotland, 5¾d. to 6d. Heavy oils, in bulk, North, 6¼d. to 7d. Carbolic acid, 1s. 5d. to 1s. 6d. prompt. Naphthalene, £11 to £14; salts, £4 to £5, bags included. Anthracene, "A" quality 2½d. per minimum 40 p.ct., purely nominal; "B" unsaleable.

Successful Capital Issue at Barnet.—With regard to the sale by tender of £15,000 of "D" capital gas stock of the Barnet District Gas and Water Company, which was recently advertised in our columns, it may be mentioned that the stock was applied for more than twice over; the prices tendered ranging from £116 to £110 per £100 of stock. The average price realized was £112 1s. 10d., and the lowest price to receive allotment £111.

NORTH-EAST COAST COAL TRADE.

From our Own Correspondent.

There has been, if anything, a slightly brighter feeling in the market during the past week, but without very much change in prices. It may be due, in some measure, to the Easter holiday of the previous week, or in some cases—for instance, that of coking coals—to a small increase in prompt inquiry combined with the limitation of output. It will be difficult for prices to rise much on the latter score, because so many collieries are closed, or working short time, which could open out and produce more coal if better prices were obtainable.

There is little news of the doings of the Joint Committee, except the disparaging remarks of the Miners' Secretary. It appears that their sittings are not yet concluded. At any rate the two parties can hardly have failed to agree about the seriousness of the situation.

As already mentioned, there has been slightly better inquiry for prompt shipments of coking coals, and unscreened makes have been firmer at 17s. 6d. to 17s. 9d. for good qualities. Gas coals, however, have shown an easier tendency. Wear Specials quote 19s. 6d. to 20s. f.o.b., but for prompt tonnage there is little difficulty in obtaining them at 19s. The same applies to best qualities, which quote 19s. 6d. to 19s. 9d. Seconds are nominally 17s., and, while some makes are steady at this price, others are obtainable at 16s. 6d. Durham unscreened bunkers are unchanged at about 18s. for best qualities.

COAL TRADE IN THE MIDLANDS.

From our Local Correspondent.

Stocks at the pithead do not seem to have been appreciably relieved as a result of the Eastertide suspension. A few collieries in the district are working full time; but their activity is due to exceptional conditions, output over the whole area being on a decidedly lower scale than before the holidays. The market outlook is exceedingly dejected. Values generally are unstable. Pressure to sell causes great irregularity of prices. Buyers can pick up odd lots at bargain rates; but there is such an utter lack of confidence that speculation is smothered. The only firm features are D.S. nuts and slacks. Price consolidation there is due not to expansion of demand but to contraction of supply owing to the drying-up of the house coal trade. Nuts and slacks command substantially better prices than could be got when the domestic trade was more active.

Blast-furnace coke is in very slow sale. Following the suspension of a basic furnace in South Staffordshire, a Derbyshire furnace which has been smelting foundry pig is being stopped; so that there will be a further displacement. Coke can now be bought at 14s. to 15s., though the basis for the current quarter under the stabilization arrangement is 15s. 9d. The first step is being taken to transfer labour from the Holly Bank pits on the confines of the Black Country to the new electrified Hilton main, where the chief concentration will be henceforward. The decision to close down the Great Wyrley Colliery in the Cannock Chase coalfield is now being given effect to.

YORKSHIRE AND LANCASHIRE COAL TRADE.

From our Local Correspondent.

Gas coals in Yorkshire and Lancashire are not in so big a demand as they were a few weeks ago, and there are indications of a reduction in price when contracts are renewed for the next twelve months.

House coals remain fairly steady, and so far prices have not been disturbed to any great extent. Very little alteration in prices is anticipated during the early summer months, owing to the irregular working of collieries.

There is no improvement in the demand for industrial fuel; and although prompt supplies of the lower grade kinds are on offer at low figures, consumers generally are unable to take advantage of this owing to their contract obligations. There is not likely to be an alteration in this direction for some time. The majority of the larger centres report no progress. In Lancashire, there is a fair demand for the best qualities of slacks; but the commoner kinds are down to about 11s. per ton. Prices at the Lancashire pits are unchanged, and no alteration is probable until after June.

The slump in export fuel still continues, although some collieries are endeavouring to meet the situation by accepting low prices; but it is a question whether this can be continued for long, owing to the heavy costs of production.

Prices at Hull at the week-end were: Bunker and export coal, f.o.b. usual shipping ports. South Yorkshire: Hards, Association, 19s. 9d. to 20s. 6d.; screened gas coal, 19s. to 19s. 6d.; washed trebles, 20s. 6d.; doubles, 17s. 3d. to 17s. 9d.; singles, 17s.; smalls, 13s. 3d.; unwashed doubles, 15s. 9d. to 16s. 3d.; rough slack, 10s. 6d. to 11s.; smithy peas, 20s. to 20s. 6d. per ton. West Yorkshire: Hartley's, 17s. to 18s.; screened gas coal, 18s.; washed trebles, 18s. 6d.; doubles, 17s. 6d.; singles, 17s.; smalls, 12s. 9d.; unwashed trebles, 18s.; doubles, 13s. to 13s. 6d.; rough slack, 10s. 3d. to 10s. 6d.; coking smalls, 9s. 6d. to 10s. 6d. per ton. Derbyshire and Notts: Top hards, 17s. 6d. to 19s. 9d.; washed trebles, 17s. 9d.; doubles, 17s. 6d. to 18s.; singles, 17s.; smalls, 12s. 9d.; unwashed doubles, 15s.; rough slack, 10s. 6d. to 11s. per ton. Yorks, Derby, and Notts: Screened steam coal, 15s. to 17s.; gas coke, 22s. to 23s. 6d.; furnace coke, 17s. to 17s. 6d. per ton.

Cardiff Gas Company's Athletic and Social Club.—The fourth annual meeting of the Club was held on Friday, April 24. In the Secretaries' report reference is made to the excellent work which the late Mr. George Clarry did for the Club. The report goes on to say that they "are fortunate to have secured, to fill the vacancy of President, Mr. H. D. Madden." The accounts were closed on March 31; and the balance-sheet shows the substantial sum of £228 to the credit of the Club. The meeting was held at the Grand Hotel; and after the business proceedings a musical programme was enjoyed.

TRADE NOTES.

"Gas Cookers for 1925."

Stoves, Ltd., of Scotland Road, Warrington, have recently issued a new catalogue bearing this title. The cover is most attractive, and is in keeping with the appearance and quality of their cookers.

Tar Plant for Dewsbury.

The Gas Department of the County Borough of Dewsbury, on the recommendation of their Engineer and Manager, Mr. H. L. Bateman, have placed an order with the Woodall-Duckham Vertical Retort and Oven Construction Company (1920), Ltd., for a tar dehydration plant (T.I.C. lead bath), to produce tar to the Road Board specification. The plant has a capacity of 10 tons a day.

Pyrometers.

The Bowen Instrument Company, of No. 9, Newton Road, Leeds, have published two pamphlets in which are described the "Pyro" insertion pyrometer and an electrical pyrometer designed to measure the temperatures of type-metal in printers' casting plants. The "Pyro" instrument is designed for workshop use in aluminium and non-ferrous foundries, in which there has been a great demand for a rapidly operating pyrometer.

The New Gladstone Dock.

Messrs. Stothert & Pitt, Ltd., of Bath, have received an order for 27 electric jib cranes of their latest pattern crank-operated horizontal luffing type. Nineteen of these will have a lifting capacity of 3 tons at 74 ft. 9 in. radius, or 1½ tons at 85 ft. 9 in.; and the other eight cranes will deal with 1 ton at 48 ft. 6 in. radius. These 27 cranes, together with 31 similar ones which the firm are now building, form the complete equipment of the new Gladstone Dock.

The Automatic Light Controlling Company, Ltd.

The Bournemouth Corporation have just agreed to renew their contract with the British, Foreign, and Colonial Automatic Light Controlling Company, Ltd., of No. 100, Holdenhurst Road, Bournemouth, for a further term of five years, for the hire of "Gunfire" controllers. Their first contract was in 1900, when the number was 162. The contract has been continuously renewed, and the number has increased till now it is between 3000 and 4000. This does not include nearly 2000 used by the Bournemouth Gas and Water Company. The town of Luton have recently placed an order for "Gunfire" controllers.

The "Du-Ex" Expansion Nipple.

The "Du-Ex" (double expansion) nipple, manufactured from specially-drawn steel tubing, is a short length of tube so machined as to form two annular internal beads. These occur at the end which is to be inserted in a tapped main. The lower bead is located at the extremity of the nipple, so that, when expansion takes place, the nipple will be riveted inside the main. The upper head is at such a distance therefrom that the nipple will also be expanded or riveted on the outside of the main. The intervening diameter is thereby pressed outward by this dual expansion; and thus the screwed portion of the nipple, which fits into the main, is so tightened that perfect contact of the threads is assured. A booklet describing this nipple has just been published by the manufacturers—Messrs. J. Stone & Co., Ltd., of Deptford, London, S.E. 14. (London Office: Oceanic House, No. 1a, Cockspur Street, S.W.1.)

CONTRACTS OPEN.

Coal.

Tenders are invited by the County Borough of Dewsbury for the supply and delivery of 16,000 tons of gas coal and nuts. [See advert. on p. 327.]

The Silsden Urban District Council require tenders for the supply of 2600 tons of gas coal covering a period of twelve months. [See advert. on p. 327.]

The Gas Committee of the Congleton Corporation are inviting tenders for the supply of 6000 tons of washed gas nuts or beans. [See advert. on p. 327.]

Tenders are invited by the Sidmouth Urban District Council for the supply of about 3000 tons of Yorkshire screened coal for their gas and electricity works. [See advert. on p. 327.]

The Gas Committee of the Nantwich Urban District Council are prepared to receive tenders for their requirements covering twelve months of screened gas coal and washed gas slack or nuts. [See advert. on p. 327.]

EXTENSIONS.

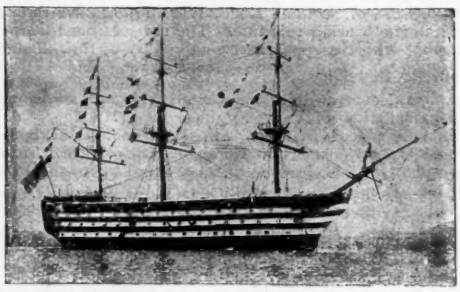
Telpher Plant at Chesterfield.

The Chesterfield Gas Committee have decided to extend the telpher track in connection with the new retort installation at the Central Gas-Works, at an estimated cost of £186.

Extensions at Oswaldtwistle.

At a meeting of the Oswaldtwistle Council on April 23, Mr. R. Dawson (the Chairman) said that among the new schemes which the Council would have to tackle during the coming year was an extension of the gas-works, at a cost of £21,000.

City of Santos Improvements Company, Ltd.—The annual meeting of the Company was held on Wednesday, April 22—Mr. N. B. Dickson, M.Inst.C.E., presiding. Referring to the gas undertaking, he said that the reduction in the price of gas had benefited the receipts. During the year, 357 additional heaters, and 71 water heaters, were connected. There was a strong demand for residuals; and good prices were realized. Residuals returned 47·89 p.ct. of the cost of coal, as compared with 46·31 p.ct. in 1923. The working results were more encouraging than for some years past; and they anticipated better results for the current year, provided there was no appreciable fall in exchange.

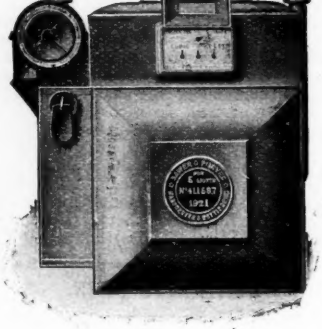


THE

OLD VICTORY,

AND THE

NEW—



BOTH SUPREME!

SAWER & PURVES,

MILES PLATTING, MANCHESTER.

RADFORD ROAD, NOTTINGHAM.

45-47 WESTMINSTER BRIDGE RD., LONDON, S.E.1.

Metrogas Operatic Society.

The members of the recently formed Metrogas Amateur Operatic Society are to be congratulated on the success which attended their third production. The selection on this occasion was Gilbert and Sullivan's "Iolanthe," by permission of Mr. D'Oyly Carte; and the hall of the Co-Partnership Institute at the East Greenwich Works of the South Metropolitan Gas Company was taxed to its limit to accommodate the audiences during the four performances—on Wednesday, Thursday, Friday, and Saturday of last week. The caste (all the members of which, together with the Producer and Musical Director and the orchestra, are employees of the South Metropolitan Gas Company) was well selected; and their excellent rendering met with an enthusiastic and much applauded reception throughout. At the concluding performance on Saturday, the principal lady members of the caste were the recipients of numerous floral and other tributes.

Debenture Stock for Haywards Heath.—Among the advertisements in this issue will be found an offer by Messrs. A. & W. Richards for sale by tender of £12,000 of 5 p.ct. perpetual debenture stock of the Haywards Heath District Gas Company. The minimum price of issue is £95 per £100 of stock; and the latest time for the receipt of tenders is Thursday morning, May 7. The money is required in connection with the recent purchase of the undertaking of the Cuckfield Gas Company, Ltd.

Budleigh Salterton Gas Company.—At the annual meeting of the Budleigh Salterton Gas Company, the report and accounts were adopted. The growth of the Company in every direction was referred to by the Chairman, who said more gas was sent out now than had ever been recorded in the history of the undertaking. There was every prospect of continued expansion, as the district served was becoming very popular as a residential area. The price of gas had been reduced by 1d. per therm. He did not think the shareholders had any cause for anxiety as to the effect of the electric competition in the town.

Gas Main Extensions at Carlisle.—Extensions of Carlisle gas mains to Dalston and Burgh-by-Sands are much appreciated by the inhabitants, who, according to a communication to the "Daily Chronicle" by their special correspondent, will receive gas at 3s. 6d. per 1000 c.ft. Mr. J. P. Buck (the Chairman of the Gas Committee) points out that even at Burgh there are already 61 consumers in the village, and of these more than one-half have cookers or gas fires. Between Burgh and Carlisle lies Kirkandrew, where 16 of the householders take gas. In Dalston 78 of the householders have taken a supply; and of these, 29 have had cookers fitted, and 16 gas fires. Mr. Buck looks for excellent results from the extension of the supply to these outlying villages.

Improved Results at Llandudno.—The question of an increase in salary to Mr. H. Duxbury, the Gas Manager, came up for discussion at a meeting of the Council last week, when it was proposed by one member that the question be referred back. Mr. J. E. Payne, supporting the increase, said that in 1920 there were dark days in the gas concern, which led them to spend £61,000. They had a cheeseparing policy in those days, and did not consider the Manager. The output of gas since that time had largely increased, and the leakage had been reduced from 11·36 to 7·84 p.ct. Mr. R. C. Baxter (the Chairman of the Gas Committee) said that they were making more gas from less coal. In the past they had spent hundreds of pounds on expert advice, and in Mr. Duxbury they had a man who was clever at his work. The recommendation was adopted.

Welsbach Light Company's Dinner.—On April 17 the annual dinner given to the outside representatives, depot managers, and departmental managers of the Welsbach Light Company, Ltd., was held at the Caledonian Salon, Holborn Restaurant; and the evening proved a tremendous success. Mr. J. R. Yates, the Chairman of the Company, was in the chair, supported by Mr. H. Talbot, the General Manager. A special menu card which had been compiled by Mr. R. H. Palmer caused great amusement, and resulted in creating that atmosphere of conviviality which is so essential to the success of such functions. Embodied in the menu were many extremely humorous advertisements and a column of personal references entitled "Things we would like to know." After dinner the members were entertained to a concert. Interspersed with the musical programme were several speeches; the one given by the Chairman being especially happy. From the various remarks it was obvious that a great feeling of co-operation exists between all members of the firm. Everyone seems to be imbued with the one idea of making each year more successful than the last as regards the firm's prosperity.

The annual report of the Dalton gas undertaking shows that the make of gas has increased during the past year to 18,963,300 c.ft. The amount of gas unaccounted-for was 2,910,800 c.ft., compared with 1,059,500 c.ft. last year.

The annual financial statement issued by the Darwen Corporation shows a loss of £3256 on the gas undertaking, as compared with a profit of £3002 a year ago. The price of gas has remained at 3s. 8d. per 1000 c.ft. throughout the year.

At a meeting of the Clitheroe Town Council on April 22 Mr. J. Boothman, Chairman of the Finance Committee, said the capital account of the gas undertaking was £99,000. Of this, £55,000 had been paid-off out of profits, and there was also £17,000 invested in sinking fund; the present net indebtedness on the works being £18,000.

Two old servants of the Portsea Island Gas Light Company, having reached the extended age limit of 70, have, under the Company's new pension scheme, just retired—Mr. W. Heath after forty years' service, and Mr. J. Martin after thirty. At the Flathouse Works recently, Mr. Mills (the Works Superintendent) expressed the wishes of all for the health and happiness of Messrs. Heath and Martin. To each he presented a cosy easy chair, as a mark of the regard of the Engineer (Mr. T. Carmichael) and all at the Flathouse Works.

STOCK MARKET REPORT.

DISTINCTLY cheerful conditions prevailed on the Stock Exchange last week, and there was an appreciable increase in the volume of business transacted. The absence of alarums and excursions doubtless accounted for the confidence which prevailed. No effect was noticeable of the declaration of the new French Government, but subsequent events both in France and in Germany may still have far-reaching results.

It is rumoured that another effort will be made shortly to reduce the heavy burden of the 5 p.c. War Loan. It is expected that a further offer of conversion to a longer-dated loan will be made, carrying interest at a rate below the 4½ p.c. rate of last year's offer. The prospects, in view of the dearer money at the present time, depend entirely on the price at which the conversion will be made. No further announcement has, at the time of writing, been made regarding the £3,000,000 Birmingham Loan which is to carry interest at 4¾ p.c., but it is expected that the price will be on the high side.

Issue.	Share.	When ex-Dividend.	Dividends. Prev. Hf.Yr.	Dividends. Last Hf. Yr.	NAME.	Quotations. Apl. 24.	Rise + or Fall − on Week.	Transactions Lowest and Highest Prices.
£			% p.a.	% p.a.				
171,978	Stk.	Feb. 5	5	5	Aldershot 5 p.c. max. C.	78—81	..	..
295,492	"	"	4	4	Do. 4 p.c. Pref.	71—76	..	73
1,551,868	"	Apl. 2	6½	6½	Alliance & Dublin Ord.	66—71	..	66½—67½
374,000	"	Jan. 8	4	4	Do. 4 p.c. Deb.	63—68	..	..
300,000	5	Oct. 23	8	8	Bombay, Ltd.	5—5½	..	5 5/16—5 7/16
100,000	10	Mar. 5	8½	8½	Bournemouth 5 p.c.	12—13	..	..
425,050	10	"	7	7	Do. B 7 p.c.	12½—12¾	..	..
150,000	10	"	6	6	Do. Pref. 6 p.c.	11—12	..	..
50,000	Stk.	Jan. 8	3	3	Do. 3 p.c. Deb.	56—59	..	..
162,025	"	"	4	4	Do. 4 p.c. Deb.	76—79	..	..
992,045	"	Mar. 5	6 5/10	6 5/10	Brentford A Con.	95—105	..	..
990,500	"	"	6½	6½	Do. B New	95—105	..	95—98
76,000	"	"	5	5	Do. 5 p.c. Pref.	95—98	..	..
306,690	"	Dec. 18	4	4	Do. 4 p.c. Deb.	76—81	..	..
181,337	"	"	6	6	Do. 6 p.c. Rich. Red. Deb.	100—105	..	..
214,740	"	Mar. 5	11½	12½	Brighton & Hove Orig.	165—170	..	..
244,200	"	"	8½	9½	Do. A Ord.	122—125	..	..
1,887,500	"	Feb. 19	5	5	Bristol 5 p.c. max.	96½—97½a	..	..
855,000	"	Mar. 19	8	7	British Ord.	112—117	..	110—112
100,000	"	Dec. 18	7	7	Do. 7 p.c. Pref.	123—128	..	..
120,000	"	"	4	4	Do. 4 p.c. Red. Deb.	72—77	..	..
100,000	10	Dec. 18	8	6	Cape Town, Ltd.	7—8	..	..
100,000	10	Apl. 23	4½	4½	Do. 4½ p.c. Pref.	6—7*	..	..
150,000	Stk.	Dec. 18	4½	4½	Do. 4½ p.c. Deb.	71—76	..	..
626,860	"	Feb. 19	6	6	Cardiff Con. Ord.	101—104	..	..
237,860	"	Jan. 8	7½	7½	Do. 7½ p.c. Red. Deb.	104—107	..	..
137,150	"	Feb. 19	5	6½	Chester 5 p.c. Ord.	89½—94½b	..	..
1,513,280	"	Mar. 5	6	5/14/8	Commercial 4 p.c. Cap.	86—89	−1	85½—87½
560,000	"	"	6	5⅝	Do. 3½ p.c. Cap.	86—89	−1	86½—87
475,000	"	Dec. 18	3	3	Do. 3 p.c. Deb.	57—60	..	58½
800,000	"	14 Jan. 15	—	—	Continental Union, Ltd.	35—40	..	35—35½
200,000	"	Dec. 18	7	7	Do. 7 p.c. Pref.	88—92	..	89—89½
660,000	"	Mar. 5	6½	6½	Croydon sliding scale	100—103	..	..
284,975	"	"	5	5	Do. max. div.	83—86	..	..
492,270	"	Feb. 19	6	9	Derby Con.	110—112c	..	..
55,000	"	Jan. 8	4	4	Do. Deb.	74—76c	..	..
1,002,180	I	Jan. 22	6	4	European, Ltd.	7—8	..	7—7⅞
16,460,070	Stk	Feb. 19	5½	5½	Gas Light & Coke 4 p.c. Ord.	85—87	−1½	85½—87½
2,600,000	"	"	3½	3½	Do. 3½ p.c. max.	62—65	..	63½—64
4,062,235	"	"	4	4	Do. 4 p.c. Con. Pref.	78—80	..	79 - 80
4,761,930	"	Dec. 18	3	3	Do. 3 p.c. Con. Deb.	59—62	..	60½—61¾
130,000	"	—	10	10	Do. 10 p.c. Bonds	..	..	196½
42,000	"	"	7½	7½	Do. 7½ p.c. Ilford Deb.	..	..	..
82,500	"	Mar. 19	6½	6½	Hastings & St. L. 5 p.c. Conv.	92—97	..	..
258,740	"	"	5½	5½	Do. 3½ p.c. Conv.	73—78	..	..
70,000	10	Sept. 25	10	10	Hongkong & China, Ltd.	16—17	..	..
86,600	Stk.	Mar. 5	10	10	Hornsey 7 p.c.	138—143	..	..
1,976,000	"	Nov. 20	30	10	Imperial Continental Cap.	179—184	..	180—182
263,950	"	Feb. 5	3½	3½	Do. 3½ p.c. Red. Deb.	71—74	..	..
235,242	"	Mar. 19	6½	6½	Lea Bridge 5 p.c. Ord.	96—101	..	..
2,127,340	"	Feb. 19	5½	5½	Liverpool 5 p.c. Ord.	87—88b	−½	86½—87½
800,000	"	Mar. 19	7	7	Do. 7 p.c. Red. Pref.	103½—104½b	..	104½ - 103
165,736	"	Feb. 19	9	8	Maidstone 5 p.c. Cap.	122—132	..	..
63,480	"	Dec. 18	3	3	Do. 3 p.c. Deb.	54—57	..	..
75,000	5	Dec. 4	7	5	Malta & Mediterranean	4¼—4¾	..	..
541,920	Stk.	Nov. 20	4	4	Montevideo, Ltd.	62—67	..	..
2,061,315	"	Mar. 5	5	5	Newcastle & Gateshead Con.	79½—80d	−½	..
300,929	"	"	4	4	Do. 4 p.c. Pref.	72½—73½d	..	..
529,705	"	Dec. 18	3½	3½	Do. 3½ p.c. Deb.	68½—69½d	..	..
15,000	10	Mar. 5	11	12	North Middlesex 10 p.c.	..	..	..
75,940	10	"	7 7/10	8⅝	Do. 7 p.c.	..	..	..
300,000	Stk.	Dec. 4	7	9	Oriental, Ltd.	102—107	..	..
188,120	"	Jan. 8	7¼	7¼	Plym'th & Ston'house 5 p.c.	109—114	..	..
60,000	50	Mar. 5	13	14	Portsea Island B	96—99	..	..
100,000	50	"	12	13	Do. C	93—98	..	..
2,289,909	I	—	—	—	Primitiva Ord.	10/0—11/0	..	10/0—11/0
311,100	100	Dec. 1	4	4	Do. 4 p.c. Red. Deb.	79—81	..	..
600,000	Stk.	Jan. 22	4	4	Do. 4 p.c. Red. Deb. 1911	63—65	..	..
229,335	"	Dec. 18	4	4	Do. B. Aires 4 p.c. Rd. Db.	65—67	..	..
321,670	"	"	4	4	Do. R'r P'te 4 p.c. Rd. Db.	65—67	..	..
150,000	10	Mar. 19	6	6	San Paulo 6 p.c. Pref.	7⅞—8⅛	..	8⅛
125,000	50	Jan. 2	5	5	Do. 5 p.c. Red. Deb.	43—46	..	..
270,000	Stk.	Mar. 19	5½	5½	Sheffield A	102—104e	..	..
419,968	"	"	5½	5½	Do. B	102—104e	..	..
1,047,000	"	"	5½	5½	Do. C	102—104e	..	102½—102¾
90,000	10	Oct. 23	8	6	South African	7—9	..	..
6,609,895	Stk.	Feb 19	5	6½	South Met. Ord.	94—95	..	94—95½
1,895,445	"	Jan. 8	3	3	Do. 3 p.c. Deb.	59—62	..	61
734,000	"	Mar. 5	6½	6½	Do. 6½ p.c. Red. Deb.	102½—104½	..	103 5/16
91,500	"	Mar. 5	8½	8½	South Shields Con.	135—136d	..	..
1,187,795	"	Feb. 19	6½	6½	South Suburban Ord. 5 p.c.	97—102	−1	97—98
368,837	"	Dec. 18	5	5	Do. 5 p.c. Deb.	97—100	..	..
647,740	"	Nov. 6	5	5	South'mpt'n Ord. 5 p.c. max.	83—86	..	..
121,275	"	Dec. 18	4	4	Do. 4 p.c. Deb.	72—77	..	..
250,000	"	Mar. 5	7	7	Swansea 7 p.c. Red. Pref.	101½—103½	−½	102—103
200,000	"	Dec. 18	6½	6½	Do. 6½ p.c. Red. Deb.	103—105	..	103½—104½
120,000	"	Feb. 19	8	8	Tottenham District A 5 p.c.	116—119	..	..
882,275	"	"	6½	6½	Do. B 3½ p.c.	98—101	..	..
181,255	"	Dec. 18	4	4	Do. 4 p.c. Deb.	75—79	..	..
258,251	"	Mar. 19	5	5	Tynemouth Con. and New	77—79d	..	..
197,294					Uxbridge, Maidenhead, &			
88,330	"	Feb. 19	6½	6½	Wycombe 5 p.c.	100—105	..	..
91,800	"	"	5	5	Do. 5 p.c. pref.	95—100	+2	95½
	"	"	—	6½	Do. 5 p.c. Maidenh'd	90—95	..	..
					Wandsworth, Wimbledon, and Epsom—			
30,000	"	Mar. 5	9½	9½	Wandsworth A 5 p.c.	130—135	..	..
255,636	"	"	7½	7½	Do. B 3½ p.c.	110—115	..	..
392,955	"	"	6/9/6	6/9/6	Do. C and New	95—100	..	97½
352,000	"	"	7½	7½	Wimbledon 5 p.c.	105—110	..	..
98,000	"	"	7½	7½	Epsom 5 p.c.	115—120	..	..
88,416	"	Dec. 18	3	3	3 p.c. Deb.	57—60	..	58

Quotations at:—*a.*—Bristol. *b.*—Liverpool. *c.*—Nottingham. *d.*—Newcastle. *e.*—Sheffield. * Ex. div.

Investment stocks benefited from Budget expectations of a decrease in the rate of income-tax. Should some relief be given, the Stock Exchange can hardly fail to derive considerable advantage therefrom. Home Rails were much steadier, although still under the cloud caused by the reduced traffic receipts. In the Industrial Market there was a distinct revival, and several sharp rises occurred.

Transactions in the Gas Market were heavier than usual. Of the quotations, Uxbridge 5 p.c. preference rose 2 points, but the remaining changes were on the downward scale. Gas Light ordinary were again marked down by 1½ points. Several capital issues were announced during the week: North Middlesex Gas Company £16,000 Ordinary Stock at £117 10s. minimum; Littlehampton Gas Company £5000 6 p.c. Redeemable Debenture Stock minimum par; Ashton Gas Company £40,000 5¼ p.c. Perpetual Debenture Stock at par.

The following transactions were recorded during the week:

On Monday, Aldershot 4 p.c. preference 73, Alliance and Dublin 66½ *ex* div., British 112, Commercial 4 p.c. 86½, 87, 3½ p.c. 87, 3 p.c. debenture 58½, European 7, Gas Light and Coke 86¼, 86½, 86⅝, 87¼, 4 p.c. preference 79, 79¾, 3 p.c. debenture 62, Imperial Continental 182, Primitiva 10s. 1¼d., 10s. 3d., 10s. 4½d., 10s. 6d., 10s. 9d., 11s., South Metropolitan 94¼, 6½ p.c. debenture 103 5/16, South Suburban 5 p.c. 98. Supplementary prices, Brighton and Hove 6 p.c. "B" preference 106, Dover 5¼ p.c. debenture 102½, Gas Light and Coke 10 p.c. bonds 196½, Leatherhead new 4 p.c. debenture 76.

On Tuesday, Alliance and Dublin 67, 67¼ *ex* div., Bombay 5 5/16, British 110, Continental Union 35, European 7, Gas Light and Coke 86, 86¼, 86⅜, 87, 3 p.c. debenture 61, 61½, Imperial Continental 180, 180½, Primitiva 10s., 10s. 3d., Sheffield "C" 102¼, 102¾. Supplementary prices, British, Hull, 4 p.c. mortgage debentures 72, 72½.

On Wednesday, Bombay 5 1/16, 5 3/16, Brentford "B" 95, Commercial 4 p.c. 87½, Continental Union 35, 7 p.c. preference 89, 89½, Gas Light and Coke 85⅞, 86, 86¼, 86⅜, 86⅝, 86¾, 3½ p.c. maximum 63¾, 64, 3 p.c. debenture 61¾, Imperial Continental 180¼, Primitiva 10s., 10s. 3d., 10s. 4½d., 10s. 5½d., San Paulo 6 p.c. preference 8⅛, South Metropolitan 94½, 95, South Suburban 5 p.c. 97. Supplementary prices, Gas Light and Coke 10 p.c. bonds 196½.

On Thursday, Bombay 5¼, Brentford "B" 98, Continental Union 35¼, 35⅜, European 7½, Gas Light and Coke 85½, 85⅞, 86, 86⅛, 4 p.c. preference 70½, 80, 3 p.c. debenture 60⅝, 61½, 61⅝, Imperial Continental 180, 181, 181½, Primitiva 10s., 10s. 4½d., 10s. 6d., South Metropolitan 94, 94¼, 95, 95½, South Suburban 5 p.c. 97, 98. Supplementary prices, Brighton and Hove 6 p.c. "B" preference 107¾, Gas Light and Coke 10 p.c. bonds 196½, Liverpool 5 p.c. 86⅞, 87¼.

On Friday, Bombay 5¼, Brentford "B" 95, 96, British 112, Commercial 4 p.c. 86½, 87⅛, 3½ p.c. 86½, Gas Light and Coke 85½, 85⅝, 86, 86½, 4 p.c. preference 79, 79½, 79¾, 3 p.c. debenture 61,, 61⅛, Imperial Continental 180½, Liverpool 7 p.c. preference 104½, 105, Primitiva 10s., 10s. 7½d., South Metropolitan 94½, 94⅓, 3 p.c. debenture 61, Swansea 7 p.c. preference 102, 103, 6½ p.c. debenture 103¾, 104½, Uxbridge, Maidenhead, 5 p.c. preference 95½, Wandsworth 3 p.c. debenture 58. Supplementary prices, Wandsworth 3½ p.c. new 97½.

Money was scarce in Lombard Street during the week, but towards the close the demand was not particularly keen. Rates remained high, however. Although old day-to-day loans were renewed at 4 p.c., as much as 4½ p.c. had to be paid for new money, but a few balances were obtained at cheaper rates. Again no Treasury Bonds were allotted, and the rate at which the Bills were allotted was £4 4s. 0·66d. p.c., being 7·28d. p.c. above last week's average.

Sterling was the centre of interest on the Foreign Exchange market. The New York rate went to a fresh high level on Friday at 4.81½, and the prospects of reaching parity were again revived. French francs closed at 92.52½, Belgian francs at 95.12½, and Italian lire at 117.

Silver was dull, the quotation declining ⅛d. to 31 1/16d. per oz. Gold was 86s. 3d. per oz.

The Bank Rate is 5 p.c., to which it was raised from 4 p.c. on March 5. Bankers' deposit rates are 3 p.c. The deposit rates of the discount houses are 3 p.c. at call and 3¼ p.c. at notice.

The price of gas has been reduced in Withnell and Brinscall from 4s. 6d. to 4s. 3d. per 1000 c.ft.

The Wakefield Electricity Department are boosting electric cooking by reduced prices of all electricity, but especially for cooking and heating; by the hire of cookers at 7s. 6d. per quarter (for cooker for 4 to 6 persons) and 10s. (for 6 to 10 persons)—the hire charge including delivery and fixing of cooker and switchboard, an electric kettle, and maintenance of the whole apparatus, subject to fair wear and tear. Domestic heating charges are 1d. per unit where a cooker is installed, as against 1½d. otherwise, and 5d. to 6d. per unit (according to quantity) for lighting.

The Directors of the Oriental Gas Company, Ltd., have resolved to pay, on May 30, an interim dividend at the usual rate of 5½ p.ct., less income-tax, on account of the year ending on June 30 next.

At Blackpool, on April 23, Mr. J. H. Chew, Gas Engineer and Manager, reported that during the year ended March 31 ten miles of gas mains were laid and 1689 new consumers connected, compared with 5½ miles of mains and 1084 consumers for the previous year. The Easter output was just under 20,000,000 c.ft.—an increase of 2½ million c.ft., or 14½ p.ct. During the five weeks ended April 22 the output was 85⅞ million c.ft.—an increase of 6¾ p.ct. During the month 150 new consumers were connected, against 95 a year ago.

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